Marketing Series No. 132

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# MARKETING OF GUAVA, PAPAYA AND LITCHI IN INDIA

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Marketing of gua.

Marketing Series No. 152.

133

# MARKETING OF GUAVA, PAPAYA AND LITCHI IN INDIA

DIRECTORATE OF MARKETING & INSPECTION
MINISTRY OF FOOD AND AGRICULTURE
(DEPARTMENT OF AGRICULTURE)
GOVERNMENT OF INDIA
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# PREFACE

In the manufacture of fruit and vegetable products in our country, the processors invariably have to be content with fresh fruits and vegetables readily available in the city markets. The material utilised is an unassorted mixture of several varieties varying widely in their stage of maturity, colour, etc. The heterogeneous nature of the raw material makes it difficult to maintain a uniform standard of the finished products not only from season to season but from batch to batch prepared during the same season. For ensuring standardisation of finished products, it is necessary to have adequate and regular supplies of varieties of fruits and vegetables of fairly uniform quality and suitable for canning and preservation.

One of the handicaps in the way of planned development of fruit and vegetable preservation in the country has been the lack of adequate information with regard to concentrated areas of production of fruits and vegetables commonly utilised by the fruit and vegetable preservation industry and the availability of suitable varieties. Various Committees such as the Central Fruit Products Advisory Committee, Development Council for Food Processing Industry and others concerned with the development of this industry, therefore, emphasised the need for a rapid survey for estimating area and production of important fruits and vegetables and for locating pockets of concentrated production. In pursuance of the recommendations made by the various Committees, a country-wide *ad hoc* survey was undertaken by the Directorate of Marketing and Inspection in 1962-63. The field survey that was confined to important fruits and vegetables covered both the *rabi* and *kharif* seasons. The fruits surveyed were: pineapple, citrus fruits, temperate fruits, mango, guava, papaya, litchi, grapes and bananas. Among the vegetables, only potato, onion, tomato,

peas and beans, cabbage, cauliflower, knol-knol, carrot, turnip and ginger were surveyed. The data collected have been compiled and presented in a series of 13 reports. This report deals with Guava, Papaya and Litchi.

The report attempts to present essential information in regard to estimates of area and production utilisation and various marketing aspects. In many States, complete records with regard to area and production of fruits and vegetables were not available. In such cases, these estimates had to be based on enquiries made from the State Departments of Agriculture, graders and others. Before finalising the estimates, these were cross-checked with the arrivals and despatches.

On the basis of the information collected, an attempt has also been made to indicate the areas of concentrated production of different fruits and vegetables in various States. As the research work relating to determination of suitability of different varieties of fruits and vegetables for processing has started only recently, the suitability of available varieties of various fruits and vegetables has been indicated only in a broad manner. It is hoped that the information contained in this report will be useful to processors, co-operatives and others.

Shri B. D. Joshi, Deputy Agricultural Marketing Adviser, Shri S. C. Bhattacharya, Senior Marketing Officer, and Shri P. Ramaswamy, Marketing Officer, were associated with the collection of data and compilation of this Report.

The Directorate gratefully acknowledges the assistance and co-operation extended by the State Government officials, merchants, co-operatives, producers and others in the compilation of this Report.

The Government of India should not be regarded as assuming responsibility for any statement contained in this Report.

NAGPUR;
*The 2nd Nov.*, 1965.

R. T. MIRCHANDANI,
*Agricultural Marketing Adviser to the Government of India.*

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# MARKETING OF GUAVA, PAPAYA AND LITCHI IN INDIA

## INTRODUCTION

### General

**Guava**

The common guava, *Psidium guava*, is a native of Central America but is now grown all over the tropics and sub-tropics. It is not known when or how it came to India, but it is believed that it might have been introduced into this country in the seventeenth century or so.

The guava is grown in California and Florida in the U.S.A., and in Cuba, Brazil, Mexico, Peru, Hawaii and India. It is found wild on the Mediterranean coast of France and Algeria and is also grown in Southern China and the Peninsula.

Guava is one of the most delicious fruits that can be readily eaten. It is valued for its high vitamin C and other nutritional contents such as vitamins A and B and iron, calcium and phosphorus. It is pre-eminently suited for jelly-making and for preparing many other kinds of preserves.

Although it is grown all over the country, the States of Uttar Pradesh, Bihar, Madhya Pradesh and Maharashtra are well known for its cultivation. It is only during recent years that guava cultivation has started receiving proper attention in the major producing States and continuous efforts are being made to step up its production.

**Papaya**

Tropical America is considered to be the original home of papaya, *Carica papaya L.* It is believed to have been introduced into India in the middle of the 16th century. Though occupying a small area at present, papaya is one of the most common fruits grown throughout the country.

Papaya is used both in the raw and the ripe form. Whereas the ripe papaya fruit is most extensively used in all tropical countries for the table, in the raw form also it is largely consumed as a vegetable. It is a very wholesome, sweet fruit, rich in sugar and digestive enzymes. It is also an important source of vitamins A and C. In addition, the raw fruit yields two industrial products—papain and pectin.

The papaya is tropical in its climatic requirements and grows and fruits luxuriantly in the warm and humid regions of the world near the equator.

### Litchi

Among the many fine fruits which China has given to the world, litchi, *Litchi chinensis*, is one. It is a most popular fruit in China, both as a fresh fruit and in its dried form. In spite of its excellent quality, litchi fruit has spread to other parts of the world only to a limited extent and that too in comparatively recent times, due to its exacting requirements of climate and soil for its optimum growth.

China, the original home of litchi, remains the biggest producer, India being the third largest. Other countries where its cultivation has spread are Indo-China, Thailand, Hawaii, Southern Japan, Formosa, Australia, New Zealand, South Africa, Mauritius, the West Indies and Brazil and Florida in the U.S.A.

Litchi is a fleshy, succulent, translucent fruit, very sweet in taste, containing 10 to 15 per cent of soluble sugars. It is a rich source of vitamin C and it also contains fair amounts of phosphorus, calcium and iron. Small amounts of vitamins A and B are also present.

The existing area under litchi in India is too small, constituting about 0.75 per cent of the total area under fruits. There is, however, plenty of scope for the extension of this fruit along the entire foot-hill regions of Uttar Pradesh and the Punjab.

In India, litchi fruit is consumed only in its fresh condition but in China, large quantities of this fruit are dried. Recently, large-scale canning of litchi fruit has been taken up in China and the canned product is said to be of an excellent quality. Although in India, experiments in canning litchi have been successfully carried out, commercial canning of this fruit is yet to be attempted.

## The Fruit and its Cultivation

### Guava

The guava is a medium-sized tree, about 9 metres in height. It is very hardy and long-lived and grows and fruits even under indifferent attention. It is one of the least exacting of all tropical fruits in its soil and cultural requirements, growing and flourishing, as it does, under a great variety of soil and climatic conditions.

The guava grows and fruits well both in the wet and the dry regions of the country, but it seems to produce abundant crops of better quality in the irrigated tracts of the country having dry and moderate winters.

The guava is usually propagated from seeds, but trees raised from seeds are often highly variable. To avoid this variation and also to expedite fruiting, the varieties should preferably be propagated vegetatively by such methods as "inarching" or "layering".

The guava is generally planted in most parts of North and West India during the south-west monsoon, from June to August. In parts of South India, which get the south-west as well as the north-east monsoons, it may be planted in any of the two rainy seasons. The distance between trees varies from 4.5 to 6 metres in the poorer soils to 6 to 7.5 metres in the alluvial soils as in Uttar Pradesh.

In order to give the guava tree a well-balanced frame-work, pruning is done to develop three or four main branches, judiciously spaced on a low trunk. Pruning and training of the trees are generally resorted to during the first four years of their life by removing all the water-shoots and suckers from the base of the trunk and also by removing a few unwanted branches.

In U.P. and other parts of North India, guava flowers twice a year, once in February and again in June. The February or spring flowering is called *Ambe-bahar* and the June or monsoon flowering is called *Mrig-bahar*. The first crop from the February flowering ripens from July to September during the rainy season and the latter crop ripens from November to January in winter. In West and South India, the guava flowers thrice in a year in February, June and October and due to these three successive flowerings, the trees bear fruits almost throughout the year.

The *Ambe-bahar* fruits ripening in the rains—from June to August—are insipid and watery and do not keep well but the *Mrig-bahar* fruits, ripening from November to January, are excellent in quality. In most parts of India, therefore, guava trees are made to produce the *Mrig-bahar* flowering only *Ambe-bahar* crop is avoided by withholding irrigation from February onwards, till the middle of May.

The guavas take nearly five months to mature from flowering. The right stage for harvesting is indicated by the fruit colour changing from dark to yellowish green. The finest eating quality in the fruit is developed when it is allowed to turn perfectly yellow and ripen fully on the tree. But it is not generally kept so long on the tree, as in that case the fruits either drop on the ground or are eaten away by birds. Such over-ripe fruits become soft with the keeping quality impaired and become unfit for despatch to distant markets.

Individual fruits, as and when they show a slight change in colour, are, therefore, picked while they are still hard and firm,

Harvesting is done by detaching the fruits from the stalks with the hand and putting them in a basket slung from the shoulder of the picker.

The guava begins its maiden bearing from the fourth year, reaches the optimum bearing stage in its eighth year and may continue to bear heavily for 30 years or even more. It is a very hardy tree and, given good care, the span of its profitable life may extend to over fifty years.

A seedling tree of eight to ten years and above may bear 400 to 900 fruits, weighing about 65 to 80 kg., while a grafted or a layered tree of the same age may bear as many as 1,000 to 2,000 fruits weighing about 180 to 315 kg.

**Papaya**

The papaya is tropical in its climatic requirements. It grows and fruits luxuriantly in the warm and humid regions of the world near the equator. It thrives fairly well in almost all parts of the dry as well as the wet zones of the country from sea level up to an elevation of about 1,100 metres or so.

The papaya demands a well-drained soil, rich in organic matter. It is a shallow-rooted tree and, therefore, can be very successfully grown even in soils about 45 cm. deep. But it is particularly susceptible to lack of adequate drainage and aeration of the soil.

The papaya is always propagated from seeds. Seeds are first sown in seed-beds and the seedlings, when 15 to 22 cm. high, are transplanted in the plantation. Papaya seedlings are generally planted in the beginning of the south-west monsoon in the light rainfall areas and in the close of the monsoon in the heavy rainfall tracts. Seedlings planted during the monsoon grow taller and bear fruits rather sparsely at a higher level on the trunk than those planted in any other season.

Papaya is generally planted with a spacing of 2 to 2.5 metres between the plants. Heavy and successful flowering and setting of fruits at the right seasons is ensured by regular irrigation. As a rule, the papaya is grown as an irrigated crop throughout India. But in the moist hilly regions on the east and west coasts of South India, it is also grown as a rainfed crop.

Papaya trees begin to bear in 10 to 14 months from the time of planting. The production of fruits is practically continuous during the life of the tree. In the plains of North India, fruits continue to mature throughout spring and summer but in the cooler places in the hills, the fruits ripen only during February to May and seldom in the cold weather. In the milder climate

of the Deccan and most parts of South India, fruits mature throughout the year but mostly from July to February.

Mature papaya fruits are harvested when they are still hard and green but when the colour changes slightly to yellow. The fruit is generally picked with a twist of the hand.

The largest yield of papaya is obtained from young trees of two to three years of age. More commonly about three good crops are taken from the trees before they are removed.

The yield of papaya varies considerably, depending upon the soil, climate, cultural practices and also the variety. The yield per tree varies from 25 to 75 fruits and the weight per fruit may range from half kilogram to three kilograms or even more. The yield per hectare may vary according to the number of female and hermaphrodite trees remaining in the orchard after the unwanted male trees have been cut down. In different parts of India, the annual yield may be anything from 30 to 60 tonnes per hectare.

**Litchi**

The litchi is rather exacting in its climatic requirements and this explains why its cultivation is so localised in the country. It requires a moist, sub-tropical climate without heavy frost or hot dry winds.

The litchi can grow in a variety of soil types, provided they are well drained, but it does best in a deep, well drained loam, rich in organic matter.

Litchi is propagated vegetatively either by air-layering or gooteeing. The trees are planted with a spacing of 9 to 12 metres. Although litchi trees in this country are not generally manured, it responds generously to heavy manuring. After the initial training and building up of a good frame-work of the tree, very little pruning is generally done.

Layered litchi trees start bearing at the age of three to five years. In South India, bearing starts late, at the age of about six years. Seedlings take much longer to commence bearing (8 to 12 years). The yield increases progressively till the trees are about 25 years old. The bearing life of the litchi is quite long and can easily extend to sixty years or so.

In North India, the litchi flowers in February along with the mango and fruits in May-June. At this time of the year, there are no other local fruits in the market to compete with litchi. This is an important point in favour of litchi cultivation.

In South India, the time of flowering is December and that of fruiting, April and May. In Bangalore in South India, where

the climatic conditions are unusual and both summer and winter are mild, the litchi bears two crops in a year—in May and in December.

The yield of litchi varies considerably with the variety, soil, climate and irrigation. The average yield per adult tree is 100 to 150 kg. (about 4,000 to 5,000 fruits). Sometimes, it may even go up to 4.5 tonnes per hectare. In China, yields as high as 6 to 7 tonnes have been obtained.

Litchi is a highly perishable fruit and its marketing presents some serious problems. At room temperature, it does not keep for more than three to four days. The production in India is, therefore, low at present and bulk of the fruit is consumed in the local markets.

## 1. SUPPLY

Very little information is available regarding world acreage and production of guava, papaya and litchi. Much less is known about the international trade in these fruits. It is, however, known that these fruits are under commercial cultivation in a number of countries besides India. Guava is grown in California and Florida in the U.S.A., and in Cuba, Brazil, Mexico, Peru and Hawaii. Papaya is a popular edible fruit well known throughout the tropical world and is now grown on a large scale in Ceylon, the Malay Archipelago, tropical Africa and Australia. In Hawaii it is said to rank next to banana in popularity. China is the leading producer of litchi, India being the third largest. As a dried fruit it is well known in China and is shipped in this form to many occidental countries. Considerable quantities are also preserved in syrup and exported. Litchi is known to be cultivated to a limited extent in north-eastern Australia, Formosa, South Japan, Hawaii, the West Indies and Brazil.

### 1.1. Indian supplies

#### 1.1.1. Acreage

1.1.1.1. **Total acreage.**—Accurate and reliable data on the area under, and production of, guava, papaya and litchi are available only in respect of a few of the important producing States. In some of the States, revenue authorities do collect some information about the area and production for revenue purposes. During the present survey, therefore, estimates of area and production were made with the help of State Marketing Officers, horticulturists, agricultural authorities, experienced and enlightened producers, wholesale merchants, commission agents and market committees. For this reason, the estimated figures of area and production of guava, papaya and litchi presented in this report are at best an approximation only and should be taken as such.

Statements 1, 2 and 3 give the estimates of area and production of guava, papaya and litchi respectively in India during 1961-62.

The total area under guava, papaya and litchi in India during 1961-62 is estimated around 58,230, 16,050 and 11,410 hectares respectively. Although guava is cultivated to a greater or smaller extent almost in all the States in the country, only seven States are having extensive areas under this fruit. Uttar Pradesh, with a share of as much as 42.6% of the total area, is the leading State. Bihar is next in importance with 19.3% of the total area. The States of Madhya Pradesh, Maharashtra,

Punjab, Gujarat and West Bengal follow in that order, together accounting for 31.4% of the total area in the country. These seven States together account for as much as 93.3% of the total area under guava in the country, the remaining States having only small areas.

Papaya is another fruit, the cultivation of which extends to nearly all the States in the country, but nearly two-thirds of the total area are in the three States of Uttar Pradesh (29.0%), West Bengal (23.9%) and Assam (12.5%). The States of Gujarat, Bihar and Maharashtra have lesser area and contribute 9.0%, 7.1% and 5.5% respectively, to the total area in the country. The remaining States have small areas under papaya, contributing together only 13% to the total area under this fruit.

Unlike in the case of guava and papaya, the cultivation of litchi does not extend to many States but is confined to a few States only. Bihar is the most important State for litchi cultivation contributing as much as 8,380 hectares or 73.4% of the total of 11,410 hectares in the country. West Bengal and Uttar Pradesh contribute 14.4% and 3.9% respectively to the total area. The States of Punjab, Assam, Tripura and Orissa have only small scattered areas under litchi.

1.1.1.2. **Distribution of acreage.**—Statement 4 indicates the estimated area under guava, papaya and litchi in the different districts of the major producing States in the country during 1961-62.

In Uttar Pradesh, cultivation of guava extends to practically all the districts in the State. However, larger areas are found in the districts of Kanpur, Fatehpur, Unnao, Allahabad, Muradabad, Varanasi, Etawah, Faizabad and Meerut. Of these, Kanpur is the most important, having 4,220 hectares under guava out of the total of 24,780 hectares in the State.

The two districts of Sahabad and Darbhanga are the most important among the guava growing districts in Bihar and together account for more than half the total area under guava in this State. Other major guava growing districts in this State are Muzaffarpur, Saharsa and Saran.

In Madhya Pradesh, Bilaspur is the most important guava growing district accounting for 1,200 hectares out of the total of 5,530 hectares. Durg and Raipur are the two other districts important for the cultivation of guava in this State.

Among the other States, concentrated guava growing areas are to be seen in the districts of Nasik, Poona and Jalgaon in Maharashtra; Ambala, Amritsar and Karnal in Punjab; Junagarh, Ahmedabad and Amreli in Gujarat; and 24-Parganas and Midnapore in West Bengal.

As in the case of guava, cultivation of papaya also extends to almost all the districts in Uttar Pradesh, but extensive areas under papaya are found in the districts of Kanpur, Dehra Dun, Varanasi, Sultanpur and Meerut, which together account for nearly half the total area under this fruit in the State.

In West Bengal, Midnapore and 24-Parganas are the most important for papaya cultivation, each having about 800 hectares under this fruit. Murshidabad, Nadia, Burdwan and Hooghly districts are also important for papaya cultivation, each having about 400 hectares.

In Assam, large scale cultivation of papaya extends to all the districts, among which Cachar, Mikir Hills, Kamrup, Sibsagar and Goalpara are the most important. Among the other papaya growing districts in the country, Kutch, Kaira and Ahmedabad in Gujarat; Ranchi, Santhal Parganas and Patna in Bihar; and Aurangabad, Parbhani, Buldana and Ahmednagar in Maharashtra are important.

For the cultivation of litchi, the district of Muzaffarpur in Bihar is by far the most important in the country. This district with 6,640 hectares under this fruit, contributes as much as 79.2% of the total area under litchi in this State and 58.2% of the area in the country. Besides Muzaffarpur, the districts of Darbhanga, Saran and Saharsa are important for litchi cultivation in Bihar.

Outside Bihar, the districts of Murshidabad, 24-Parganas and Nadia in West Bengal and Dehra Dun and Nainital in Uttar Pradesh are important for the cultivation of litchi.

1.1.1.3. **Trend of acreage.**—As already stated, official or other reliable records indicating the area under guava, papaya and litchi over a number of years are not available except in the case of some important producing States and as such it is difficult to assess the trend of acreage for the country as a whole. The discussion on the trend of acreage of these fruits, therefore, is confined to the few major growing States for which data are available.

Statement 5 gives the area under guava, papaya and litchi in the important growing States in the country during the years 1957-58 to 1961-62. The data given in this statement indicate that, generally speaking, the area under all the three fruits under discussion has steadily increased in the important growing States during this five-year period.

In the case of guava, the increase in area during 1961-62 as compared to 1957-58 is the maximum in respect of Madhya Pradesh and amounted to 45.9%. The percentage increase in

area in the other major growing States amounts to 23.9% in Maharashtra, 15.2% in Uttar Pradesh and 12.2% in Bihar.

Bihar has registered a phenomenal increase in the area under papaya during the five years from 1957-58. As compared to the area during 1957-58, the area during 1961-62 has gone up by as much as 70.1%. In the case of Uttar Pradesh, West Bengal and Assam also, the area under papaya has steadily been increasing from 1957-58 and the increase in the area in these three States during 1961-62 amounts to 16.9%, 23.1% and 38.8% respectively.

In the case of litchi also, the area has been steadily increasing from 1957-58 to 1961-62 in the States of Bihar, West Bengal and Uttar Pradesh. The increase in area is the maximum in the case of West Bengal, amounting to 35.4% over 1957-58. In the case of Uttar Pradesh and Bihar, the increase in area is less and amounts to 24.0% and 6.4% respectively. The foregoing discussion clearly indicates that the area under guava, papaya and litchi in the major growing States, has generally been on the increase during the five years from 1957-58.

1.1.1.4. **Area under different varieties.**—The commercial varieties of guava, papaya and litchi under cultivation in different parts of the country are many and they differ in respect of their seasons, yields, resistance to pests and diseases and quality of the fruits. It has not been possible to make any estimate of the area under different varieties of these fruits. The only thing that has been possible is to collect the names of the important commercial varieties of these fruits under cultivation in different parts of the country and also the important characteristics of these varieties. These are given in Statement 6.

Most of the varieties of guava under commercial cultivation in the different States at present are introductions from Uttar Pradesh. In recent years some new varieties such as Ruby, Supreme Ruby and other Florida seedlings which are rich in vitamin C and acidity have been introduced from foreign countries.

Papaya which is universally propagated from seed, naturally bears fruits which show a good deal of variation in quality, size and shape of the fruit. It is, therefore, very difficult to maintain varietal purity unless the same variety is grown consistently in a given area. The different commercial varieties of papaya grown in the country are often found to get mixed up with one another in the field, thereby losing their original characters. Under these circumstances, papaya fruits are generally not sold in the markets under any standard varietal trade names.

### 1.1.2. **Production**

1.1.2.1. **Yield per hectare.**—The yields per hectare of guava, papaya or litchi are highly variable, depending on the variety,

number of plants per hectare, soil and climatic conditions and cultural practices. In the case of papaya, the yield also depends on the number of female and hermaphrodite trees remaining in the orchard after the unwanted male trees have been cut down.

Among the different producing States in India, Gujarat, Maharashtra, Uttar Pradesh, Bihar and West Bengal record comparatively high yields of guava ranging from 18.4 to 12.9 tonnes per hectare. The yield is slightly less in Punjab and Madhya Pradesh, amounting to 9.2 and 8.0 tonnes per hectare respectively. The all-India average yield works out to 11.2 tonnes per hectare.

In the case of papaya, Uttar Pradesh, among the major growing States, records the highest yield of 23.1 tonnes per hectare. The States of Bihar and West Bengal follow closely with 23.0 and 21.0 tonnes per hectare respectively. The yield of papaya in Maharashtra and Gujarat is lower and amounts to 18.4 and 18.6 tonnes per hectare respectively. Assam records the lowest yield of 15.3 tonnes per hectare. The average yield for the whole country works out to 20.5 tonnes per hectare.

Bihar, the most important State for litchi growing, records the maximum yield of 8.3 tonnes per hectare. West Bengal and Uttar Pradesh closely follow with 7.5 and 7.7 tonnes. Taking the country as a whole, the average yield works out to 8.1 tonnes per hectare.

Although the average yield of guava, papaya and litchi for the whole country is rather low when compared to the heavy yields obtaining in other countries important for the cultivation of these fruits, the records of isolated high yields of these fruits, here and there in the country, clearly indicate the possibilities of increasing the present low level of yield of these fruits by adopting improved cultural and manurial practices.

1.1.2.2. **Total production.**—The estimated total production of guava, papaya and litchi in the country during 1961-62 is given in Statements 1, 2 and 3 respectively.

The total production of guava amounts to 6,56,110 tonnes, of which as much as 2,75,100 tonnes or 41.9 per cent is contributed by Uttar Pradesh, the leading guava growing State. Other important producing States are Bihar, Maharashtra and Gujarat in that order together contributing 37.7% of the total production. The production in the States of Madhya Pradesh, Punjab and West Bengal is comparatively less, their share in the total Indian production amounting to only 15.2 per cent. The importance of these seven States in the production of guava can well be seen from the fact that together they contribute as much as 94.8 per cent of the total production in the country.

In the case of papaya also, Uttar Pradesh is the leading producer, contributing 1,07,500 tonnes or 32.6 per cent of the total

Indian production of 3,29,420 tonnes. West Bengal follows with 24.5 per cent of the total production. The States of Assam, Bihar, Gujarat and Maharashtra together contribute another 29.6 per cent. The production of papaya in the remaining States is much less and amounts to only 13.3% of the total Indian production.

Bihar, the premier litchi growing State, accounts for 67,780 tonnes or 76.0 per cent of the total production of 91,860 tonnes of litchi in the country. The other two important litchi producing States are West Bengal and Uttar Pradesh, accounting for 13.4 per cent and 5.2 per cent respectively of the total Indian production. The production of litchi in the remaining States has no commercial significance.

### 1.1.3. **Retention by producers**

Of the three fruits under discussion, only papaya is always propagated by seeds. Guava is propagated both by seeds and by vegetative methods. Litchi, on the other hand, is invariably propagated vegetatively. Retention of these fruits (papaya and guava) by the producers for use as sowing material is not very common, and, therefore, whatever quantities are retained by the producers are meant for domestic consumption only.

The actual quantities of these fruits retained by the producers, however, vary from place to place, depending on a number of factors such as the distance from the producing area to the market, transport facilities, demand and prices. It is, therefore, difficult to estimate the quantity retained by the producers. Estimates have, however, been attempted from enquiries in the different producing areas. The average quantities of guava and papaya retained by the producers for domestic consumption is roughly estimated at 2 per cent and 3 per cent of their respective total production in the country as a whole. In the case of litchi, which is highly perishable, the quantities retained are much less and hardly amounts to one per cent of the total production. On the basis of these estimates, the quantities of guava, papaya and litchi retained by the producers for domestic consumption during 1961-62 works out to 13,122, 9,883 and 919 tonnes respectively.

### 1.1.4. **Marketable surplus**

In the case of commodities like guava, papaya or litchi, a certain amount of wastage is unavoidable during the process of harvesting and during subsequent handling operations in the farm. This wastage is roughly assessed around 0.5 per cent of the production in the case of guava and papaya and 0.75 per cent in the case of litchi. On this basis, 3,281 tonnes of guava, 1,647

tonnes of papaya and 689 tonnes of litchi are estimated to have been lost during 1961-62 due to wastage during harvesting and handling operations in the farm. Deducting the quantities retained by the producers for domestic consumption and the quantities lost in the farm from the total production, the marketable surplus of guava, papaya and litchi during 1961-62 works out to 6,39,707 tonnes, 3,17,890 tonnes and 90,252 tonnes respectively.

### 1.1.5. **Imports and exports**

The quantities of guava, papaya and litchi exported from India are very insignificant, and very negligible quantities of these fruits move across the borders of India and Pakistan through land frontier routes. There are no imports of these fruits into this country. Thus, in India's import-export trade, these fruits do not have any place.

### 1.1.6. **Net available supplies**

On the basis of the above estimates, the net available supplies of guava, papaya and litchi in the country during 1960-61 is summarised below :

*Net available supplies during 1961-62*

(Quantity in tonnes)

| | Guava | Papaya | Litch |
|---|---|---|---|
| 1. Production | 6,56,110 | 3,29,420 | 91,860 |
| 2. Retention by producers for domestic consumption | 13,122 | 9,883 | 919 |
| 3. Wastage during harvesting and in the farm | 3,281 | 1,647 | 689 |
| 4. Marketable surplus | 6,39,707 | 3,17,890 | 90,252 |
| 5. Imports | Nil | Nil | Nil |
| 6. Exports | Neg. | Neg. | Neg. |
| 7. Net available supplies | 6,39,707 | 3,17,890 | 90,252 |

## 2. UTILISATION

### 2.1. General

Guava is one of the most delicious fruits that can be readily eaten. Much of the interest in the common guava has been due to its extremely high vitamin C contents and its nutritional qualities. The guava contains four to five times as much vitamin C as fresh orange juice, and up to ten times as much as most of the tomato varieties. Guava is also a good source of vitamins A and B and iron, calcium and phosphorus. It is pre-eminently suited for canning and jelly making and for preparing many other kinds of preserves.

Papaya is used for table purposes in the ripe form. In the raw form, it is also largely consumed as a vegetable. Papaya is a very wholesome, sweet fruit, rich in sugar and digestive enzymes. It is a good source of B-carotene (Vitamin A) and lends itself to various attractive and tasty products which are simple and easy to make. The ripe papaya fruit is used in the preparation of candies, preserves, jams, jellis, papaya nectar, toffees and dried products such as fruited cereals and baby foods. The fruited cereals made from blends of ripe papaya fruits, *maida* and glucose and subsequently dried in the flake form, have found wide popularity as breakfast foods and components of ice creams.

Besides, raw papaya fruit yields two important industrial products—papain and pectin. On tapping, the raw papaya fruit yields a milky white latex which contains a powerful protein-digesting enzyme called papain, an expensive product costing Rs. 50 to Rs. 60 per kg. Hitherto imported from abroad for various purposes such as the tenderisation of meat, manufacture of chewing gum and the preparation of pharmaceutical products, the enzyme has a ready demand in this country.

The pulp of the raw papaya fruit has been found to be very useful for making pectin, widely used as a jellying component. The Central Food Technological Research Institute, Mysore, has recently developed an integrated process for the simultaneous production of papain and pectin from raw papaya fruits. The yield of papain and pectin amounts to about 0.25 and 1.0 per cent respectively of the weight of the fruit.

Litchi is a fleshy, succulent, translucent fruit, very sweet in taste, containing 10 to 15 per cent of soluble sugars. It is a rich source of vitamin C and it also contains fair amounts of phosphorus, calcium and iron. Small amounts of vitamins A and B are also present in this fruit.

## 2.2. Utilisation by the industry

Guava, papaya and litchi are all well suited for being utilised in the fruit preservation and processing industry and in various other countries where the fruit industry is well developed, sizable quantities of these fruits are consumed by the industry. In India, however, with the exception of guava, very little of papaya or litchi is consumed by the industry. Even in the case of guava, the quantities utilised by the industry are very negligible as compared to the total production in the country. Out of the total production of about 6.5 lakh tonnes of guava, hardly 400 tonnes are annually consumed by the industry in the country.

Bulk of the production of guava, papaya and litchi in the country is thus consumed only in its fresh condition, the quantities utilised by the industry and for export purposes being negligible. But the large scale extension of the cultivation and increased production of such fruits as guava, papaya and litchi are closely linked up with a planned development of the fruit industry in the country to absorb the surplus production during the season. The establishment of an adequate number of processing units in the areas of concentrated production of these fruits and diversion of greater quantities for the industry would certainly provide the much-needed fillip to the cultivators in those areas by creating a steady demand for these fresh fruits, thereby assuring a reasonable price.

In China, large quantities of litchi fruits are dried and dried litchi fruit known as "lychee nut" is very popular in that country. Sun-dried litchi is considered better than the artificially dried one. These are exported to all parts of the world where there are Chinese settlements. Recently, large-scale canning of litchi has been taken up in China. The canned product is said to be of excellent quality. Experiments in canning litchi have also been successful in India and there appears to be a good prospect for developing export markets for canned and dehydrated litchis from India.

Canned guavas are manufactured on a large scale in the country. It is also processed in the form of jelly, jam, nectar and juice. Canned guavas and guava jelly have recently been introduced in the export markets and are finding encouraging demand.

## 2.3. Utilisation for exports

Export of fresh fruits like guava, papaya and litchi is no doubt beset with a number of problems like efficient packaging, heavy transportation costs, etc., but in the interest of building up India's export trade in fresh fruits, it is necessary to explore all avenues of potential foreign markets for these fruits. Sending of

some trial consignments of these fruits to different potential markets, to study the response, should be the first step in this direction.

### 2.4. **Varieties suitable for industry**

For canning purposes fully ripe guava fruits, preferably with white flesh and few seeds are preferred. Safeda, Lucknow 49, Chittidar and Karela are the important white fleshed varieties suitable for canning. Canned guavas often have a taste and aroma better than that of fresh fruit. Its pulp, though soft in texture, stands the processing well and does not darken during storage. From white fleshed varieties of guava, clarified juice is prepared by using a commercial pectin-enzyme preparation. The pink-fleshed variety of guava grown in Mysore contains a water unsoluble pigment and is found to be well suited for the preparation of nectar type of beverages. From the point of view of both canning and processing, the varieties Allahabadi, Apple Guava, Safeda and Dehra Dun are found to be suitable.

Experiments conducted in the fruit preservation laboratory, Sabour, reveal that among the different varieties of litchi like Desi, Bedana, Kasba, Purbi, etc., tried, the Purbi variety is best suited for canning, since it retains its original flavour, colour and texture.

### 2.5. **Quantities utilized**

The estimated total supplies of guava, papaya and litchi that were available for consumption in the country during 1961-62 and the quantities estimated to have been utilized for various purposes are summarised below :

*Supply and utilization of guava, papaya and litchi in India* (1961-62)

(Quantity in tonnes)

| | Guava | Papaya | Litchi |
|---|---|---|---|
| 1. Supply: | | | |
| (i) Total production . | 6,56,110 | 3,29,420 | 91,860 |
| (ii) Imports . . . | Nil | Nil | Nil |
| TOTAL SUPPLIES | 6,56,110 | 3,29,420 | 91,860 |
| 2. Utilization: | | | |
| (i) For table purposes . | 6,22,905 | 3,12,949 | 85,430 |
| (ii) In the industry . | 400 | Neg. | Neg. |
| (iii) For exports . . | Neg. | Neg. | Neg. |
| (iv) Wastage . . | 32,805 | 16,471 | 6,430 |
| TOTAL UTILIZATION | 6,56,110 | 3,29,420 | 91,860 |

## 3. MARKETING

### 3.1. Preparation for the market

**Harvesting.**—The time of harvesting fruits like guava, papaya and litchi and the methods of harvesting employed, considerably influence the quality of the fruit and hence also the price it fetches in the market.

The right stage for harvesting guavas for the market is indicated by the fruits changing their colour from dark green to yellowish green. Guava fruits, if allowed to turn perfectly yellow and to ripen fully on the tree, become soft and over-ripe and unfit for consumption during the time required for marketing them. Individual fruits, as and when they show a slight change in colour, are picked while they are still hard and firm. Picking is done by pulling the fruits with the hand and putting them in a basket slung from the shoulder of the picker. Fruits on higher branches are reached by using a ladder which can be leaned against the tree.

Mature papaya fruits are harvested when they are still hard and green but slightly turned yellow. If left on the tree till they turn perfectly yellow, they soon become soft. Picking is generally done by giving the fruit a careful twist with the hand. Ladders are sometimes used to pick fruits that cannot be reached from the ground. Care is necessary to avoid bruising or splitting of the skin.

Maturity of litchi fruit for harvesting is judged from the tubercles on it. The tubercles become somewhat flattened and the epicarp becomes smooth when the fruit is mature. Litchi fruit is harvested in bunches along with a portion of the branch and a few leaves. If individual fruits are harvested, the skin at the stem end is ruptured and the fruit rots quickly. The colour of the fruit undergoes rapid changes on ripening. In the coloured varieties, the skin is of a bright reddish colour. For local consumption, the fruit is harvested when it has attained this colour. For distant markets, however, the fruit is harvested when it has just started turning reddish. Litchi fruit should not be harvested immediately after rain when the trees are wet; otherwise, the spoilage of fruits in storage would be high. If the fruit is harvested when wet and later dried in the sun, the shell will turn brown.

After harvesting, the growers do very little except removing damaged, unripe or over-ripe ones from the bulk by way of preparing the fruits for the market. The fruits, after sorting, are taken to the markets for sale.

## 3.2. Assembling and distribution

### 3.2.1. Assembling

The agencies engaged in, and the methods employed for, the collection of these fruits from the growing areas and their assembling in the markets are different in the different growing States, depending upon long-standing customs.

The participation of the producers in the assembling of guava, papaya or litchi does not appear to be significant except in growing areas located near market centres or consuming cities.

Itinerant merchants seem to play a more important role in the assembling of these fruits. Being residents of the areas of production, they are familiar with the producers and are able to purchase the fruits soon after harvest. More often than not, they act as agents for the commission agents and wholesalers in the markets.

In the assembling of guava and litchi, pre-harvest contractors, known by the name 'Kunjaras' in Dehra Dun, Muzaffarnagar and Ramnagar areas, figure most prominently almost in all the major producing States like Uttar Pradesh, Bihar, West Bengal, etc. These contractors keep a close watch over the crop conditions in the growing areas, and purchase from the orchard owners the standing crop much ahead of the harvesting period. Often, the orchards change hands a number of times between the initial purchase and the actual harvesting. Because of the risks involved in estimating the yield much ahead of the harvesting time and the possibilities of reduced yield at the time of actual harvest due to a variety of causes, there is considerable difference between the price paid to the orchard owners by the pre-harvest contractors and the actual amount realised by sale of the fruits after harvest. Sometimes, the pre-harvest contractors also advance money to the producers during the early growth of the crop. The contractors generally have contacts with commission agents and wholesalers in the assembling markets. After harvesting, they arrange for the packing and transport of the fruits to the markets. Some of the contractors, instead of carrying the fruits to the assembling markets for sale, consign the same directly to consuming markets, both within and outside the State.

It has also been observed during the survey that commission agents and wholesalers in the assembling markets keep in touch with the orchard owners in the nearby growing areas either directly or through their agents, occasionally advance money and arrange for the collection of the fruits.

In so far as guava, papaya and litchi are concerned, co-operatives do not seem to play any role in their assembling in any of the producing States.

### 3.2.2. **Distribution—agencies and methods**

As is the case with fruits in general, the distribution of guava, papaya and litchi is looked after, in the main, by the wholesalers and exporters operating from the assembling markets in the major producing States. The wholesalers and exporters in the assembling markets purchase the fruits brought for sale by growers and itinerant merchants, sort the fruits, pack them in suitable containers and consign the fruits to different consuming centres.

Some of the producers and itinerant merchants also participate to a limited extent in the distribution of these fruits by selling directly to consumers in and around the producing areas.

The system of distribution of these fruits to consumers in cities and towns is just the same as followed in respect of other fruits. The commission agents and wholesalers in the consuming centres receive supplies of these fruits either from nearby areas of production, if any, or from the wholesalers and exporters in the assembling markets of major producing States like Uttar Pradesh, Bihar and West Bengal, either on consignment or on commission basis. From the commission agents and wholesalers in the consuming centres, supplies of these fruits are passed on to retailers and hawkers and from them to consumers.

Bulk consumers of these fruits, like preservation units, defence establishments, etc., usually have regular contracts with wholesale suppliers for meeting their requirements.

## 3.3. **Market practices**

### 3.3.1. **Methods of sale**

Large scale sale in villages does not appear to be common in respect of these fruits with the exception of guava in Uttar Pradesh and litchi in Bihar and West Bengal. Wherever sales are effected in villages, the method commonly followed is open negotiation between the seller and the buyer.

In the assembling markets, however, different methods of sale are followed. Even in the same market one method may be followed for one fruit and a different method for the others. In Calcutta market, for example, litchi is sold by open agreement, whereas guava and papaya are sold by *hatta* system or auction method. In the assembling markets of Bihar open auction is usually followed for the purchase and sale of litchi fruits. In Uttar Pradesh, *hatta* system or under cover system of sale is most prevalent in the case of big consignments or lots of guava. Guava and papaya fruits are usually sold by the commission agents at the railway station itself in the case of major consuming centres like Delhi. These fruits arrive in full wagon loads and the sale is

completed on the spot as soon as the fruits are unloaded. Sometimes the fruits purchased at the railway station is re-auctioned at the mandi.

### 3.3.2. **Market charges**

The various market charges payable by the sellers and buyers in some important markets are given in statement 7. Assembling and consuming markets for guava, papaya and litchi are yet to be brought under regulation, with the exception of Ahmedabad. Market charges in these markets, therefore, are prescribed by the commission agents and traders themselves by common understanding or as fixed by the association of traders, wherever they exist.

Commission payable by the seller to the commission agent is the biggest single item of payment incurred by the seller in all markets. Commission agents in Calcutta collect commission for sale of guava, papaya or litchi at 7% though 2 %, of this is refunded to the sellers at the discretion of the commission agents. There does not seem to be any justification for this practice and should be discouraged. In other markets, the usual commission collected from the sellers varies from 6 to 6.25 per cent. In Delhi market, commission agents charge the sellers commission at 6.5 per cent. Some of the agents, however, allow a rebate of 1.56 per cent out of this commission.

In addition to the commission charges, sellers have to pay for a number of other items also such as weighment, handling, postage, charity, etc.

### 3.3.3. **Arrivals**

The estimates of average annual arrivals of guava, papaya and litchi in selected important markets in the country are given in Statement 8.

For guava, the important assembling markets are Kanpur, Allahabad, Lucknow and Banaras in Uttar Pradesh: Sahabad, Muzaffarpur and Darbhanga in Bihar; Bilaspur in Madhya Pradesh; Nasik in Maharashtra; and Ambala in Punjab.

As stated earlier, papaya is being cultivated now-a-days almost in every part of the country with the result that these fruits arrive for sale in nearly all the assembling markets in smaller or larger quantities. Important assembling markets for papaya, however, are Kanpur, Dehra Dun, and Banaras in Uttar Pradesh; Kharagpur and Midnapur in West Bengal; Ranchi in Bihar and Cachar in Assam.

Litchi cultivation in the country is confined to selected areas only. As a result, there are only a few important assembling

markets for this fruit. Muzaffarpur in Bihar is by far the most important assembling market for litchi in the country. Darbhanga and Saran are the two other important assembling markets in this State. In West Bengal, Murshidabad, Midnapore and Nadia constitute the important assembling markets for litchi. Dehra Dun and Nainital are most important for this fruit in Uttar Pradesh.

In addition to these assembling markets, there are ever so many consuming centres all over the country where these fruits arrive in substantial quantities from different growing areas. For example, the arrivals of these fruits in Calcutta markets are of the order of 1,400 tonnes of guava and 1,900 tonnes of litchi. Nearly half of the total arrivals of guava is from the surrounding areas of production. Bilaspur in Madhya Pradesh and the growing centres in Uttar Pradesh are the important sources of supply for the remaining. For litchi, local areas account for 50 per cent of the arrivals, the remaining being supplied from assembling markets in Bihar among which Muzaffarpur is the most important.

Total arrivals of these fruits in Delhi markets are of the order of 10,500 tonnes of guava (mainly from Dehra Dun, Saharanpur, Lucknow and Allahabad in Uttar Pradesh and from Hoshangabad in Madhya Pradesh) and about 900 tonnes of litchi fruits (from Muzaffarpur, Patna, Ramnagar, Meerut, Dehra Dun and the growing areas in West Bengal).

### 3.4. **Packaging**

The various types of containers used for packing guava, papaya and litchi fruits in selected centres in the country, together with the size of the containers, capacity, cost, etc., are given in Statement 9.

The most commonly used containers for the packing of these fruits are baskets of varying sizes, shapes and capacities. Bucket shaped baskets, made of either *arhar* twig or bamboo, are commonly used for guavas in Uttar Pradesh, for papaya in Maharashtra, Madhya Pradesh and Gujarat and for litchi in Bihar. Cylindrical baskets, either of twig or bamboo, are used for papaya in Maharashtra and for papaya and litchi in Bihar. In Maharashtra, conical baskets are also used for guavas. Spherial baskets of different sizes are in common use for guavas in Uttar Pradesh and for litchi in Bihar and West Bengal. For packing litchis, barrel shaped baskets are also used in some centres in Bihar and semi-spherical ones in West Bengal. No other container except baskets is generally used for packing papaya. Wooden cases on account of their higher cost are not as commonly used as baskets. However, in Dehra Dun litchies are packed in wooden cases with a capacity of 9 kilograms of fruits.

Similarly, in Moradabad wooden boxes are used for packing guavas also.

There is a very wide variation in the cost of packing in different containers. The estimated cost of packing one quintal of guava varies from Rs. 2.07 in bucket shaped bamboo baskets in Maharashtra to as much as Rs. 7.34 in bucket shaped twig baskets in Uttar Pradesh, the average being Rs. 3.87. For papaya, the packaging costs vary from Re. 0.64 in Bihar to Rs. 3.68 in Madhya Pradesh with an average of Rs. 1.57. Similar costs for litchi vary from Rs. 1.68 in baskets to Rs. 8.27 in wooden cases.

Wooden cases, as used in Uttar Pradesh, have proved quite satisfactory for guavas but they are in use only to a limited extent. Amongst baskets, bucket shaped baskets made of *arhar,* twigs are comparatively strong. Semi-spherical baskets used in Uttar Pradesh have not proved so satisfactory as the contents have often been reported to be damaged owing to pressure while stacking.

For papaya, twig baskets of Madhya Pradesh have proved to be stronger than bamboo baskets used elsewhere, but the capacity of this basket should be reduced so as to minimise the preasure on the contents.

For a fruit like litchi, wooden cases, though much costlier, are no doubt better than baskets. Amongst the baskets in use at present, conical shaped bamboo baskets, as used in Bihar, give better results.

### 3.5. **Storage**

Owing to their perishable nature, fruits like guava, papaya and litchi are seldom stored by the producers for long. As soon as harvested, the produce is disposed of by the producer either at the farm itself or in the assembling markets.

In assembling markets also, commission agents usually aim at disposing of all consignments as quickly as possible, but sometimes part of the arrivals may remain unsold on the day of arrival. In such cases, the commission agent uses his godown, usually an ill-ventilated room, for temporary storage. At the end of the day, unsold packages are stocked in the godowns and again taken out for sale the next day. Sometimes when the market is dull, the commission agent may have to store the packages for two or three days and this he usually does by simply keeping the packages in his own godown. For this purpose, cold storages are not generally resorted to.

Fruit merchants in the consuming centres purchase their daily requirements early in the morning and try their best to dispose of the fruits during the day itself. Whatever may remain

unsold is kept in their shops in ordinary baskets and is offered for sale the next morning.

Commission agents in consuming markets do not charge the consignor anything for storage and, therefore, they do not also take adequate care for proper storage of the fruits. The packages are simply kept in his godowns, which more often than not are unsuitable for the purpose.

Phasing the supplies of perishable fruits like guava, papaya and litchi during different months of the year is a difficult problem. Market gluts during the peak season with resulting slumps in prices are quite usual during years of normal production. Cold storing of fruits like guava, papaya and litchi is helpful in prolonging their supplies during the season.

Ripe guava fruits can be stored at about 47°F to 56°F for about two weeks without decay. In China, the harvested litchi fruits are sprinkled with salt solution for better storage, and are put in hollow bamboo tubes which are sealed at both ends. Litchi fruits can be stored in distilled water for two to three weeks without much loss in quality. Under refrigeration at 30°F to 45°F, litchi fruit can be preserved up to three months. Even at this temperature, the shell turns brown in 48 hours. Cold storing of fruits like guava, papaya and litchi in the country is still to be attempted on commercial scale. Experiments conducted within the country, however, indicate good possibilities in this direction.

### 3.6. **Grading**

The practice of systematic grading of fruits like guava, papaya and litchi based on scientific grade standards is almost completely absent in the country. Grading of fruits at the farm by the producer himself is seldom practised. At best, what the grower does is to remove from the bulk immature, rotten or diseased fruits so that his produce may not fetch a low price in the assembling markets. It is only when the fruits are purchased at the orchards by wholesalers or pre-harvest contractors, that some sort of grading or sorting is attempted by them before the consignments are booked to consuming centres.

However, grading in the case of fruits is of late receiving better attention from the trade. Apart from sorting the fruits according to different commercial varieties or places of origin, fruit merchants sort them according to size, stage of maturity and sometimes colour also. Fruits like guava, papaya and litchi are generally graded at the despatching centres and are received in the consuming centres in that condition.

The system of grading followed by the trade, however, is not based on any recognised grade standards. What a particular grade implies in one centre may be entirely different from what the same grade means in others. Popular commercial grades intelligible to the traders in a particular centre may not convey any sense to a trader in another place. The prevailing confusion could be avoided if well-understood uniform grades and grade standards are evolved for adoption by the fruit trade. The Directorate of Marketing and Inspection should take up the task of framing suitable grades and grade standards for different varieties of guava, papaya and litchi grown in the country. From the producer's point of view, best results are possible if grading of fruits commences at the farm and is carried out by the producers themselves.

### 3.7. **Transportation**

The perishable nature of fruits like guava, papaya and litchi requires that their entire movement from their areas of production to the ultimate consumers is carried out as expeditiously as possible so that the fruits may remain reasonably fresh by the time they reach the consumers. For this reason, time is a very important factor in the transportation of such commodities.

Wherever the assembling markets or consuming centres are located near the areas of production, the fruits are easily transported either as head-loads or by bullock carts, etc.

Owing to the distinct advantages in transporting the fruits by trucks as compared to the railways, there has been, during recent years, a definite shift in favour of road transport. Trucks are now playing over long distances of even up to 400 to 600 miles connecting the producing areas of one State with the consuming centres in others. For example, guava and litchi are brought to the city markets in Calcutta by trucks from the producing areas in the States of Bihar and Uttar Pradesh and from local areas of production in West Bengal. In the case of Delhi also, trucks are extensively being used to transport guava, papaya and litchi from the neighbouring States of Uttar Pradesh, Punjab and Himachal Pradesh.

Although road transport has been on the increase, transport of such fruits by rail continues to be popular either when the supplying centres are far removed from the cities or when the fruits are to be transported in bulk. Transport by rail has the attraction of concessional freight at quarter parcel rates for all fresh fruits.

In the consuming markets, the fruits are carried from the railhead to the cities either as head-loads or by hand carts and sometimes by lorries also. In Delhi city, horse carts, locally known as "Kharkhara", having a capacity of about 3 quintals,

are largely used for transporting fruits from the railhead to the Sabzi Mandi for which charges are fixed at Rs. 2 per trip.

Transport of fresh fruits like guava, papaya and litchi by rail is faced with certain problems like delays in the movement of wagons and at points of transhipment, pilferage on the way, non-availability of insulated and refrigerated wagons for the carriage of these fruits, rough handling of the consignments, and delay in disposal of claims from the parties. The present unpopularity of the railways as carriers of fruits could be overcome only by rectifying these shortcomings.

### 3.8. **Losses in marketing**

Substantial losses during the different stages of marketing is a common occurrence in the case of perishable fruits like guava, papaya and litchi and are the result of a number of contributing factors such as the over-ripe condition of the packed fruits, unsuitability of the containers used, imperfect packaging methods followed, mode of conveyance used for transport, number of transhipments and handlings during transit, delays in the movement of the fruits from the despatching to consuming centres, and lack of adequate and proper storage facilities at the centres of consumption. In the case of guava, papaya and litchi, the incidence of wastage may be the result of any one or more of these factors which are inter-related and the extent of loss is highly variable—from a nominal wastage of 3 to 5 per cent to occasional wastage of entire consignments.

In a study conducted by the Directorate of Marketing and Inspection, Government of India, on the containers used for fruits and vegetables, the wastage of guava during transit by rail/road from some assembling centres to the consuming markets of Calcutta, Bombay and Delhi has been worked out. The findings of this study, although relating to the year 1957-58, may be taken as an indication of the extent of loss of guava during transit even today in as much as the conditions that prevail in the marketing of the fruit have not shown any marked improvement during the last few years.

Statement 10 indicates the average percentage wastage of guava packed in different containers and despatched by rail/road to Calcutta, Bombay and Delhi. The weighted average of time taken by all the consignments covered by the study was 34 hours and the weighted average wastage of guava was 6.7 per cent. The extent of wastage was highly varying, ranging from no loss in respect of consignments from Aligarh to Delhi in oval-shaped twig baskets to a loss of as much as 14.9 per cent for despatches from Allahabad to Bombay in barrel shaped twig baskets.

The same study also estimated the transit loss of guavas arriving into the markets of Calcutta, Bombay and Delhi at 5.7, 11.0 and 2.2 per cent respectively of the total arrivals. Considering the substantial arrivals of guavas into these major consuming centres, it is clear that there is considerable wastage of guava due to defective packaging and transportation and that urgent measures are imperative to minimise, if not to eliminate, the present wastage of this valuable fresh fruit.

## 4. PRICES

Reliable price data on guava, papaya and litchi are not available from any source. During the survey some data on prices could be collected only from Calcutta and Delhi markets. The discussion on prices of these fruits is, therefore, limited to the available information from these consuming markets.

### 4.1. Units of price quotation

Guava, papaya and litchi are sold both by weight and by number in different areas depending on local practices. Generally, in Southern States sale by number is common in the case of guava and papaya. In North Indian markets, on the other hand, sale by weight seems to be the usual practice, prices being quoted per quintal in the wholesale and per kilogram in the retail trade. In many of the markets in West Bengal, litchi fruit is sold by number, one hundred fruits being the unit. In some centres, as in Delhi, these fruits are sold in wholesale trade neither by weight nor by number but in lots.

### 4.2. Trend of prices

The average annual wholesale prices of guava and papaya in Calcutta and Delhi markets and of litchi in Delhi market during the years 1957 to 1961 are given in the following table :

TABLE

*Average annual wholesale prices* (1957 *to* 1961)

(Rupees per quintal)

| Year | Guava | | Papaya | | Litchi |
|---|---|---|---|---|---|
| | Calcutta | Delhi | Calcutta | Delhi | Delhi |
| 1957 | 26.12 | 42·33 | 86.88 | 60.49 | 96.55 |
| 1958 | 24.46 | 31.87 | 75.80 | 63.27 | 127.59 |
| 1959 | 23·70 | 32.89 | 79.97 | 58.44 | 125.58 |
| 1960 | 21.36 | 34.17 | 90.59 | 51.14 | 138.65 |
| 1961 | 23.06 | 33.98 | 88.08 | 58.17 | 137.29 |
| AVERAGE | 23.74 | 35.05 | 84.26 | 58.30 | 125.13 |

The data given in the above table indicate that during the five-year period from 1957 to 1961, wholesale prices of guava and papaya have remained more or less stable. Against the five-year average of Rs. 23.74 per quintal, prices of guava in Calcutta market have fluctuated between narrow limits of Rs. 21.36 per quintal during 1960 and Rs. 26.12 per quintal during 1957. Similarly in Delhi market also wholesale prices of guava have varied

from Rs. 31.87 per quintal during 1958 to Rs. 42.33 in 1957, the average price being Rs. 35.05.

Wholesale prices of papaya also have remained more or less steady during this five-year period. It varied from Rs. 75.80 to Rs. 90.59 per quintal in Calcutta market and from Rs. 51.14 to Rs. 63.27 per quintal in Delhi market.

Prices of litchi, however, show a distinct trend. From Rs. 96.55 per quintal during 1957, the prices registered a sharp rise during 1958, touching Rs. 127.59 per quintal. After remaining more or less at this level during 1959, the prices once again showed a sudden rise during 1960, reaching the maximum of Rs. 138.65 per quintal. During 1961, prices of litchi were maintained almost at this high level.

The foregoing indicates that, while litchi prices have shown a considerable increase during the five years 1957 to 1961, prices of guava and papaya have remained more or less at the same level.

### 4.3. **Seasonal variations**

Guava, papaya and litchi are all highly perishable fruits and are rarely stored for more than a few days after their harvest. Supplies of these fruits are, therefore, available in the markets, but for a short period. As a result, prices of these fruits exhibit violent fluctuations during the different months of the year.

The percentage deviation of the average monthly wholesale prices of guava and papaya from their annual mean in the major consuming markets of Calcutta and Delhi is given in Statement 19.

Prices of guava during different months in Calcutta market fluctuated within narrow limits only. The extent of deviation from the annual mean ranged from +7.26% during September to —10.34% during March. As against this, prices in Delhi market exhibit a severe seasonality, the prices fluctuating between a maximum of 52.22% above the mean during the month of May and a minimum of 37.08% below the mean during August.

In the case of papaya, the seasonal variation in prices during the different months was equally pronounced in the case of Calcutta as well as Delhi. In Calcutta market, papaya prices fluctuated between a maximum of +42.28% over the mean during September and a minimum of —30.38% during February. In Delhi market, maximum prices (+31.56%) were seen during October and minimum prices (—26.16%) during March.

Data given in Statement 20 indicate that the retail prices of guava and papaya during the different months of the year

also exhibit more or less a similar seasonality as their corresponding wholesale prices.

The phasing of supplies during different months of the year becomes a problem in the case of fruits like guava, papaya or litchi on account of its perishability and the problem involved in their storage. The cultivation of early, mid and late varieties and the adoption of different seasons in different growing areas may help to some extent in evening out the supplies over longer periods.

### 4.4. **Comparison of prices in different markets**

The average annual wholesale prices of guava and papaya in the two important consuming markets of Calcutta and Delhi are compared in the following table :

TABLE

*Comparison of wholesale prices of guava and papaya in Delhi and Calcutta markets*

(Rupees per quintal)

| Year | A Guava | | | B. Papaya | | |
|---|---|---|---|---|---|---|
| | Calcutta | Delhi | Percentage increase in Delhi over Calcutta | Delhi | Calcutta | Percentage increase in Calcutta over Delhi |
| 1957 | 26.12 | 42.33 | 62.1 | 60.49 | 86.88 | 43.6 |
| 1958 | 24.46 | 31·87 | 30.3 | 63.27 | 75.80 | 19.8 |
| 1959 | 23.70 | 32.89 | 38.8 | 58.44 | 79.97 | 36.8 |
| 1960 | 21.36 | 34.17 | 60.0 | 51.14 | 90.59 | 77.1 |
| 1961 | 23.06 | 33.98 | 47.4 | 58·17 | 88.08 | 51.4 |
| AVERAGE | 23.74 | 35.05 | 47.6 | 58.30 | 84.26 | 44.5 |

As between Calcutta and Delhi, prices of guava were more in Delhi market. Against an average price of Rs. 23.74 per quintal in Calcutta, the price in Delhi amounted to Rs. 35.05 per quintal showing an increase of 47.6%. In regard to papaya, however, the reverse appears to be the case. Prices in Calcutta market were always high as compared to Delhi. In Calcutta, the average price of papaya amounted to Rs. 84.26 per quintal, an increase of 44.5% over the price of Rs. 58.30 per quintal in Delhi market. Among the many factors that contribute towards such differences in prices between different consuming markets, differences in the quality of the fruits is by far the most important.

### 4.5. **Retail prices**

Mention was made earlier about the paucity of data regarding wholesale prices of guava, papaya and litchi. The position

regarding retail prices is no better. For this reason, a discussion on retail prices of these fruits has become extremely difficult and has to be restricted to the available data.

Statements 16 to 18 give the average monthly retail prices of guava, papaya and litchi in Delhi market during the years 1957 to 1961. The wholesale and retail prices of these fruits are compared in the following table :

TABLE

*Comparison of wholesale and retail prices of guava, papaya and litchi fruits in Delhi market* (1957 *to* 1961)

(Rupees per quintal)

| Year | Guava | | | Papaya | | | Litchi | | |
|---|---|---|---|---|---|---|---|---|---|
| | Wholesale | Retail | Percentage increase in retail over wholesale | Wholesale | Retail | Percentage increase in retail over wholesale | Wholesale | Retail | Percentage increase in retail over wholesale |
| 1957 | 42.33 | 52.00 | 22.8 | 60.49 | 197.00 | 225.7 | 96.55 | 117.00 | 21.2 |
| 1958 | 31.87 | 43.00 | 34.9 | 63.27 | 194.00 | 206.6 | 127.59 | 165.00 | 29.3 |
| 1959 | 32.89 | 45.00 | 36.8 | 58.44 | 180.00 | 208.0 | 125.58 | 166.00 | 32.2 |
| 1960 | 34.17 | 44.00 | 28.8 | 51.14 | 160.00 | 212.9 | 138.65 | 212.00 | 53.0 |
| 1961 | 33.98 | 49.00 | 44.2 | 58.17 | 191.00 | 228.3 | 137.29 | 199.00 | 45.0 |
| AVERAGE | 35.05 | 46.60 | 30.0 | 58.30 | 184.40 | 216.3 | 125.13 | 171.80 | 37.3 |

The difference between the wholesale and retail prices is made up of the various expenses incurred by the retailer as well as his profit. On account of the risks involved in handling such perishable fruits as guava, papaya or litchi, the retailers naturally try to work on a high margin so as to compensate any possible loss due to spoilage. This is brought out by the above table wherein the wholesale and retail prices of guava, papaya and litchi in Delhi market are compared. The percentage increase in retail prices over wholesale prices during the different years varied from 22.8 to 44.2 with an average of 30.0 in the case of guava and from 21.2 to 45.0 with an average of 37.3 in the case of litchi. In the case of papaya, however, retail prices show an abnormally high increase over wholesale prices. During the five years, the increase varied from as much as 206.6% to 228.3% with an average of 216.3%. This is something very unusual and the reasons for such abnormally high increase in retail prices over wholesale prices in the case of papaya are not quite clear.

## 4.6. Marketing costs and margins

In order to study the relative share of the producers in the price paid by the consumers and also to analyse the incidence and size of various costs and margins of the intermediaries involved in the marketing of guava, papaya and litchi, three typical examples of price-spread have been collected from the producing State of Uttar Pradesh. These are given in Statement 21.

The marketing of perishable fruits like guava, papaya and litchi is characterised by certain special features. Firstly, the supplies are seasonal and the production is highly localised in concentrated pockets. Secondly, owing to their perishable nature, there is very little of storage of these fruits and the general tendency is to market the fruits as soon as possible after harvest. Thirdly, the fruits have to be carried over long distances to meet the consumers' demand from distant markets. All these factors have profound influence, either collectively or individually in determining the incidence and size of various costs and margins involved in the marketing of these fruits.

The percentage share of the producers in the consumers' rupee, the marketing costs and margins of the intermediaries in respect of the three price-spread examples given in Statement 21 are compared in the following table :

TABLE

*Comparison of marketing costs and margins in the marketing of litchi and papaya in different centres*

(In terms of percentage share in consumer's rupee)

| | Example 1 | Example 2 | Example 3 |
|---|---|---|---|
| 1. Commodity | Litchi fruits | Litchi fruits | Papaya |
| 2. Variety | Calcuttta | Calcutta | Common Desi |
| 3. Quantity | 40 seers | One maund | 4 quintals |
| 4. From | Saharanpur | Saharanpur | Amroha |
| 5. To | Delhi | Saharanpur | Delhi |
| 1 2 | 3 | 4 | 5 |
| 1. Net price realised by the producer. . | 59.5 | 75.4 | 42.9 |
| 2. Marketing costs of the | | | |
| (i) Producer . | 14.0 | 7.9 | 2.3 |
| (ii) Exporter . . | 9.7 | .. | 24.1 |
| (iii) Wholesaler . | .. | .. | 1.6 |
| (iv) Retailer . . | 1.7 | 2.1 | 2.3 |
| TOTAL . | 25.4 | 10.0 | 30.3 |

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| 3. | Margins to— | | | |
| | (i) Exporter . | 6.4 | .. | 6.0 |
| | (ii) Wholesaler . | .. | .. | 6.7 |
| | (iii) Retailer . | 8.7 | 14.6 | 14.1 |
| | TOTAL . | 15.1 | 14.6 | 26.8 |
| 4. | Consumer's price . | 100.0 | 100.0 | 100.0 |

The share of the producer was the maximum (75.4%) in Example 2. In this case, the producer and the consumer are in the same market, eliminating heavy costs of transportation, which otherwise would have absorbed a fair slice of the consumer's rupee. Further, the fruits are directly sold to the retailer, thus saving on the costs and margins of such intermediaries as exporters, wholesalers, etc.

In Example 1, the share of the producer amounted to 59.5% of the consumer's rupee. The reduced net return to the producer was the result of heavy marketing costs (25.4%) and margins of the intermediaries (15.1%).

The return to the producer was the lowest in Example No. 3 (42.9%). As much as 30% of the price paid by the consumer was absorbed by the expenses of the different agencies and another 26.8% was taken away as profit by the various intermediaries.

The margin of the exporter and the wholesaler varied from 6.0% to 6.7% in the consumers' price and that of the retailer from 8.7% to 14.6%.

A net return to the producers of 42.9% to 59.5% of the consumer's price is certainly very low and can only indicate the unsatisfactory conditions that exist in the present system of marketing of such fruits. One of the major factors responsible for such low return to the producers is the heavy marketing costs, which together absorb about 25 to 30% of the consumers' rupee. The cost of transporting these fruits from the assembling to the consuming centres is quite substantial and accounts for a major item of cost. But in commodities like guava, papaya or litchi, where long distant transport is inevitable, the transportation costs are bound to be high.

Another factor responsible for the poor return to the producers is the relatively high margins of the retailers engaged in this trade. The margins of the retailers dealing in perishable fruits are generally high as compared to those dealing in other agricultural commodities. This is because of greater hazards involved in handling, transport and storage of the produce. Quite often, the retailers have to bear substantial losses due to spoilage of the produce and, eventually, they work on a higher margin so as to compensate possible loss, if any. Thus, under the existing pattern of marketing, any appreciable reduction in their margins also does not appear to be possible.

It, therefore, appears that the net return to the producers could be increased only by eliminating such intermediaries as itinerant merchants, commission agents, etc. This is possible if the producers participate in the assembling and distribution of these fruits to a greater extent by organising themselves into producers, co-operatives.

## 5. CONCLUSIONS AND RECOMMENDATIONS

### 1. Improvement of yield

Yields of guava, papaya and litchi in India are comparatively low, but isolated records of higher yields obtained here and there in the States of Uttar Pradesh, Bihar and West Bengal by adopting improved methods of cultivation clearly prove that a general increase in the yield of these fruits in the country is quite possible by adopting improved farming methods. Cultivators of these fruits in the major producing States of Uttar Pradesh, Bihar, West Bengal, etc., should be properly educated in the improved techniques of cultivation.

Systematic crop improvement programme for the evolution of improved varieties and for studies on varietal, manurial and cultural practices should be instituted in these major producing States.

### 2. Increasing the area and production of the fruits

Although the area under, and production of, guava, papaya and litchi in the major producing States have been showing a steady increase during the last few years, there are immense possibilities of extending the area under these fruits at a faster pace than at present, provided adequate demand could be developed for the increased production.

The demand for guava, papaya and litchi for consumption as fresh fruit in and around the areas of production is generally inelastic and at the same time the carrying of fruits from the producing areas to distant consuming areas involves heavy costs and substantial wastage. It would, therefore, appear that the best way of providing the necessary impetus for the extension of acreage under these fruits is to establish canning and processing units as near the producing areas as possible with a view to absorbing the increase in production of the fresh fruit.

### 3. Exports of guava, papaya and litchi

Export trade of India in fresh fruits like guava, papaya and litchi is practically nil and export of these fresh fruits is beset with a number of problems like efficient packaging, heavy transportation costs, etc. But it is necessary to explore all avenues of foreign markets for these fruits by sending trial consignments in the interest of developing India's export trade in fresh fruits.

### 4. Utilisation by canning and processing industry

Large scale extension of area under fresh fruits in countries like U.S.A., Australia, Hawaii, etc., is a direct result of the

development of a good export trade, high level of per capita consumption within the country, and the establishment and development of canning industries. In India, with the exception of guava, very little of litchi and papaya is consumed by the industry. Even in the case of guava, quantities utilised by the industry are negligible as compared to the total production. Hardly 400 tonnes, out of the total annual production of 6.5 lakh tonnes, are used by the industry.

The establishment of an adequate number of processing units in the areas of concentrated production of these fruits and diversion of greater quantities for the industry would certainly provide the much needed fillip to the cultivators in those areas by creating a steady demand for these fresh fruits and thereby assuring a reasonable price.

In China large quantities of litchi fruits are dried and in this form exported to foreign countries. Recently, canning of litchi has also been taken up in China. Enterprising manufacturers in India should come forward and start producing canned and dehydrated litchis for both the domestic and the export markets.

Recently a co-operative society in Jalgaon in Maharashtra State has taken up the production of papaya powder by spray drying process. Trial consignments of the manufactured powder are reported to have received good response from foreign countries. This is a profitable line of utilising the fresh papaya fruits produced in the country.

### 5. **Regulation of markets**

Most of the important assembling markets for these fruits are located in the States of Uttar Pradesh, Bihar and West Bengal. In none of these States the assembling markets for fruits have as yet been brought under regulation and transactions in these markets are carried on by traditional methods. Unauthorised and arbitrary deductions like *dharmada*, postage, etc., are quite common. Auction method of sale, which ensures competitive rates to the seller, is rarely followed and the rates of commission charged are often exorbitant. In order to bring the benefits of market regulation to the producers in these areas, the possibilities of regulating at least the major assembling markets in these States require immediate consideration.

### 6. **Unit of price quotations**

Prices of guava, papaya and litchi are quoted in a number of markets by number. This system of quoting prices by number does not appear to be quite rational since fruits of different varieties of guava, papaya or litchi are highly variable in size and any comparison of prices based merely on the number of fruits is

obviously not accurate. A better system would be to quote the prices per unit weight, indicating also whether the fruits are of assorted size or are of big, medium or small size.

### 7. **Wastage of fruits during transit**

Loss of guava, papaya, or litchi due to wastage during different stages of marketing is found to be quite substantial, mainly on account of the unsuitability of the containers, imperfect packaging methods and delays in transportation. Urgent measures are therefore, imperative to minimise, if not to eliminate, the present wastage of this valuable fresh fruit. Among the measures that could be adopted with advantage are : (i) avoiding over-ripe, injured or diseased fruits from the pack, (ii) using containers of adequate strength to withstand the rough handling in transit, and (iii) avoiding all delays in the carriage of the fruits from the assembling to consuming points.

### 8. **Grading of guava, papaya and litchi**

In order to avoid the existing confusion in the fresh fruit trade in guava, papaya and litchi due to lack of standardisation and grading, it is necessary for the trade to adopt suitable grade standards—understandable to everybody—uniformly. The Directorate of Marketing and Inspection, Government of India, should immediately take up the formulation of suitable grades and grade standards for these fruits.

Best results can be achieved if grading commences at the farm and is carried out by the producers themselves. This helps not only in securing for them the extra margin that goes to the retailer, who invariably resorts to some form of sorting the fruits before sale, but also in facilitating easy marketing in major consuming cities.

### 9. **Prevention of seasonal gluts**

Production of fruits like guava, papaya and litchi is seasonal and their perishable nature makes it impossible for the producers to phase the supplies in the market. Seasonal gluts have thus become a common phenomenon in the assembling markets in years of normal production, pushing down the prices to uneconomically low levels.

Developing techniques of cold storing these fruits and establishing adequate processing and preservation units near about the areas of production to absorb the surplus during the season appear to be the two measures that will considerably help in preventing the now frequent market gluts.

## 10. **Increasing the net return of the producers**

The share of the producer of guava, papaya and litchi in the price paid by the consumer is rather low as a result of heavy transportation costs and larger margins of the retailers. But in commodities like these, long distance transport is inevitable and the transportation costs are bound to be high. Similarly, on account of the greater hazards involved in handling such perishable fruits, the retailers naturally work on higher margins, so as to compensate possible loss, if any, and hence any appreciable reduction in the retailer's margin may not also be possible. It is thus clear that the net return to the producers could be increased only by eliminating such intermediaries as itinerant merchants, commission agents, etc. The producers of these fruits should, therefore, come forward for greater participation in the assembling and distribution by organising themselves into co-operatives.

## STATEMENT 1

*Estimates of area and production of guava in different States in India* (1961-62)

| Sl. No. | State | Area (Hectares) | Production (Tonnes) |
|---|---|---|---|
| 1. | Uttar Pradesh | 24,780 | 2,75,100 |
| 2. | Bihar | 11,210 | 1,34,800 |
| 3. | Madhya Pradesh | 5,530 | 44,270 |
| 4. | Maharashtra | 4,600 | 63,210 |
| 5. | Punjab | 3,870 | 35,650 |
| 6. | Gujarat | 2,690 | 49,540 |
| 7. | West Bengal | 1,560 | 20,090 |
| 8. | Mysore | 810 | 7,440 |
| 9. | Andhra Pradesh | 680 | 8,000 |
| 10. | Delhi | 610 | 5,600 |
| 11. | Rajasthan | 560 | 4,460 |
| 12. | Assam | 480 | 2,450 |
| 13. | Orissa | 320 | 1,630 |
| 14. | Tripura | 200 | 410 |
| 15. | Jammu & Kashmir | 170 | 1,590 |
| 16. | Madras | 100 | 1,200 |
| 17. | Others | 60 | 670 |
| | TOTAL | 58,230 | 6,56,110 |



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## STATEMENT 2

*Estimates of area and production of papaya in different States in India* (1961-62)

| Sl. No. | State | Area (Hectares) | Production (Tonnes) |
|---|---|---|---|
| 1. | Uttar Pradesh | 4,650 | 1,07,500 |
| 2. | West Bengal | 3,840 | 80,840′ |
| 3. | Assam | 2,000 | 30,600 |
| 4. | Gujarat | 1,310 | 24,340 |
| 5. | Bihar | 1,140 | 26,270′ |
| 6. | Maharashtra | 880 | 16,190 |
| 7. | Madhya Pradesh | 490 | 12,150 |
| 8. | Orissa | 480 | 8,660 |
| 9. | Punjab | 300 | 7,000 |
| 10. | Rajasthan | 260 | 6,500 |
| 11. | Tripura | 240 | 3,660 |
| 12. | Madras | 200 | 2,200 |
| 13. | Andhra Pradesh | 130 | 1,400 |
| 14. | Mysore | 70 | 770 |
| 15. | Delhi | 40 | 930 |
| 16. | Others | 20 | 410 |
| | TOTAL | 16,050 | 3,29,420 |

## STATEMENT 3

*Estimates of area and production of Litchi in different States in India* (1961-62)

| Sl. No. | State | Area (Hectares) | Production (Tonnes) |
|---|---|---|---|
| 1. | Bihar | 8,380 | 69,780 |
| 2. | West Bengal | 1,640 | 12,360 |
| 3. | Uttar Pradesh | 620 | 4,770 |
| 4. | Punjab | 210 | 1,150 |
| 5. | Assam | 200 | 1,530 |
| 6. | Tripura | 200 | 1,250 |
| 7. | Orissa | 160 | 1,020 |
| | TOTAL | 11,410 | 91,860 |

## STATEMENT 4

*Estimates of area under guava, papaya and litchi in different districts in the important producing States in India* (1961-62)

(Area in hectares)

| State | District | Area |
|---|---|---|
| | GUAVA | |
| Uttar Pradesh | Kanpur | 4,220 |
| | Fatehpur | 1,840 |
| | Unnao | 1,450 |
| | Allahabad | 1,400 |
| | Muradabad | 1,380 |
| | Varanasi | 1,370 |
| | Etawah | 1,060 |
| | Faizabad | 1,050 |
| | Meerut | 940 |
| | Farrukhabad | 760 |
| | Agra | 610 |
| | Saharanpur | 600 |
| | Budaun | 560 |
| | Partapgarh | 520 |
| | Jaunpur | 500 |
| | Muzaffarnagar | 480 |
| | Mirzapur | 460 |
| | Ghazipur | 460 |
| | Others | 5,120 |
| | TOTAL | 24,780 |
| Bihar | Sahabad | 5,320 |
| | Darbhanga | 2,240 |
| | Muzaffarpur | 760 |
| | Saharsa | 600 |
| | Saran | 600 |
| | Gaya | 480 |
| | Ranchi | 320 |
| | Patna | 240 |
| | Others | 650 |
| | TOTAL | 11,210 |
| Madhya Pradesh | Bilaspur | 1,200 |
| | Durg | 860 |
| | Raipur | 610 |
| | Hoshangabad | 310 |
| | Rewa | 260 |
| | Jabalpur | 240 |
| | Indore | 240 |
| | Raigarh | 130 |
| | Bhind | 90 |
| | Guna | 90 |
| | Sagar | 80 |
| | Narasimhapur | 80 |
| | Others | 1,340 |
| | TOTAL | 5,53 |

STATEMENT 4—*contd.*

| State | District | Area |
|---|---|---|
| | GUAVA—*contd.* | |
| Maharashtra | Nasik | 610 |
| | Poona | 400 |
| | Jalgaon | 390 |
| | Osmanabad | 350 |
| | Aurangabad | 340 |
| | Bhir | 330 |
| | Bhandara | 285 |
| | Ahmednagar | 250 |
| | Satara | 215 |
| | Parbhani | 210 |
| | Others | 1,220 |
| | TOTAL | 4,600 |
| Punjab | Ambala | 410 |
| | Amritsar | 400 |
| | Karnal | 330 |
| | Firozepur | 320 |
| | Rohtak | 320 |
| | Bhatinda | 310 |
| | Hissar | 300 |
| | Hoshiarpur | 240 |
| | Sangrur | 240 |
| | Ludhiana | 210 |
| | Patiala | 200 |
| | Others | 590 |
| | TOTAL | 3,870 |
| Gujarat | Junagarh | 810 |
| | Ahmedabad | 490 |
| | Amreli | 405 |
| | Bhavnagar | 365 |
| | Broach | 305 |
| | Kaira | 205 |
| | Others | 110 |
| | TOTAL | 2,690 |
| West Bengal | 24-Parganas | 800 |
| | Midnapore | 430 |
| | Malda | 30 |
| | Purulia | 20 |
| | Others | 280 |
| | TOTAL | 1,560 |

STATEMENT 4—*contd.*

| State | District | Area |
|---|---|---|
| | PAPAYA | |
| Uttar Pradesh | Kanpur | 680 |
| | Dehradun | 400 |
| | Varanasi | 320 |
| | Sultanpur | 320 |
| | Meerut | 320 |
| | Unnao | 170 |
| | Aligarh | 115 |
| | Bulandshahar | 115 |
| | Muzaffarnagar | 110 |
| | Nainital | 110 |
| | Faizabad | 105 |
| | Lucknow | 100 |
| | Fatehpur | 75 |
| | Others | 1,710 |
| | TOTAL | 4,650 |
| West Bengal | Midnapore | 860 |
| | 24-Parganas | 800 |
| | Murshidabad | 480 |
| | Nadia | 420 |
| | Burdwan | 360 |
| | Hooghly | 360 |
| | Howrah | 120 |
| | Darjeeling | 80 |
| | Others | 360 |
| | TOTAL | 3,840 |
| Assam | Cachar | 380 |
| | Kamrup | 350 |
| | Sibsagar | 290 |
| | Goalpara | 210 |
| | Nowgong | 130 |
| | Darrang | 110 |
| | Lakhimpur | 90 |
| | Others | 440 |
| | TOTAL | 2,000 |

STATEMENT 4—*contd.*

| State | District | Area |
|---|---|---|
| | PAPAYA—*contd.* | |
| Gujarat | Kutch | 550 |
| | Kaira | 140 |
| | Ahmedabad | 130 |
| | Bhavnagar | 90 |
| | Baroda | 80 |
| | Others | 320 |
| | TOTAL | 1,310 |
| Bihar | Ranchi | 260 |
| | Santhal Parganas | 240 |
| | Patna | 180 |
| | Hazaribagh | 70 |
| | Muzaffarpur | 50 |
| | Others | 340 |
| | TOTAL | 1,140 |
| Maharashtra | Aurangabad | 210 |
| | Parbhani | 80 |
| | Buldana | 65 |
| | Ahmednagar | 65 |
| | Jalgaon | 60 |
| | Amraoti | 60 |
| | Others | 340 |
| | TOTAL | 880 |
| | LITCHI | |
| Bihar | Muzaffarpur | 6,640 |
| | Darbhanga | 740 |
| | Saran | 300 |
| | Saharsa | 220 |
| | Monghyr | 140 |
| | Champaran | 80 |
| | Bhagalpur | 80 |
| | Ranchi | 80 |
| | Others | 100 |
| | TOTAL | 8,380 |

## STATEMENT 4—*contd.*

| State | District | Area |
|---|---|---|
| | LITCHI—*conta.* | |
| West Bengal | Murshidabad | 510 |
| | 24-Parganas | 400 |
| | Nadia | 370 |
| | Hooghly | 180 |
| | Others | 180 |
| | TOTAL | 1,640 |
| Uttar Pradesh | Dehra Dun | 180 |
| | Nainital | 120 |
| | Muzaffarnagar | 35 |
| | Others | 285 |
| | TOTAL | 620 |

## STATEMENT 5

*Area under guava, papaya and litchi in the important growing States in India during the years* 1957-58 *to* 1961-62.

(Area in hectares)

GUAVA

| | Uttar Pradesh | Bihar | Madhya Pradesh | Maharashtra |
|---|---|---|---|---|
| 1957-58 | 21,500 | 9,990 | 3,790 | 3,710 |
| 1958-59 | 23,200 | 10,400 | 4,820 | 3,980 |
| 1959-60 | 24,720 | 10,660 | 4,650 | 4,140 |
| 1960-61 | 26,020 | 10,960 | 5,020 | 4,210 |
| 1961-62 | 24,780 | 11,210 | 5,530 | 4,600 |

PAPAYA

| | Uttar Pradesh | West Bengal | Assam | Bihar |
|---|---|---|---|---|
| 1957-58 | 3,980 | 3,120 | 1,440 | 670 |
| 1958-59 | 4,200 | 3,250 | 1,500 | 750 |
| 1959-60 | 4,300 | 3,640 | 1,650 | 830 |
| 1960-61 | 4,560 | 3,780 | 1,750 | 920 |
| 1961-62 | 4,650 | 3,840 | 2,000 | 1,140 |

LITCHI

| | Bihar | West Bengal | Uttar Pradesh |
|---|---|---|---|
| 1957-58 | 7,880 | 1,210 | 500 |
| 1958-59 | 8,040 | 1,320 | 540 |
| 1959-60 | 8,156 | 1,460 | 550 |
| 1960-61 | 8,270 | 1,520 | 570 |
| 1961-62 | 8,380 | 1,640 | 620 |

## STATEMENT 6

*Important commercial varieties of guava, papaya and litchi under cultivation in India and their chief characteristics*

### GUAVA

1. Uttar Pradesh:

(i) Apple colour . A good variety but not extensively cultivated on account of its shy bearing habit; has very attractive apple-like colour; fruits medium size; round to spherical; skin colour light red or pinkish; pulp soft, flesh creamy white, melting soft; flavour pleasant; taste sweet; average weight 4 oz.; good keeping quality.

(ii) Safeda Allahabad. Best variety grown all over the State; quality of fruit and fruiting habit good; fruit medium size; round; skin colour straw yellow; taste sweet; quality very good; keeping quality medium; heavy bearer; average weight 6 oz.

(iii) Red-fleshed. . A Commercial variety well known for its red flesh; fruits medium; ovate roundish; skin colour greenish yellow or pinkish yellow; pulp soft melting; flesh reddish in colour; flavour pleasant and smell like apricot; taste acidic sweet; fruit weight 6.3 oz.; quality medium; poor keeping quality; heavy bearer.

(iv) Seedless . . Poor yielder but well known for its quality and seedlessness; medium size; pulp white, semi-hard, soft when fully ripe; sweet; excellent quality; seedless.

(v) Lucknow-49 . A selection from Safeda. Not widely grown in this State, but is a promising one. A commercial variety of Bombay and South India; fruits medium to large; ovate round; skin yellowish white; pulp soft and melting; flesh creamy white; flavour slightly acidic; taste acidic sweet; fruit weight 6.4 oz.; quality good; keeping quality very good heavy bearer.

(vi) Chittidar . . Not much different from Safeda except for some red spots here and there on the skin of the fruit ("chittis"); fruits medium; roundish ovate; pulp soft and melting; flesh yellowish white; flavour mild; taste acidic sweet; fruit quality medium; keeping quality good; medium bearer.

STATEMENT 6—*contd.*

GUAVA—*contd.*

| | | |
|---|---|---|
| (vii) | Mirzapur . . | A seedling selection from Allahabad Safeda; medium; roundish; pulp soft when fully ripe; flesh white; flavour mild; taste medium; acidic sweet; fruit quality medium; keeping quality good; medium bearer. |
| (viii) | Karela . . | A medium variety not very popular; large; terminate to pyriform in shape; greenish yellow colour; pulp; soft melting flesh white and granular; pleasant and very rich flavour; sweet taste; fruit weight 8.5 oz.; fruit quality medium; keeping quality medium to good; poor bearer. |
| 2. | Andhra Pradesh: | |
| | (i) Seeded types . | Red-fleshed, Banarasi, Smooth Green, Smooth White, Guava No. 49, Allahabad Safeda Chittidar, Safeda. |
| | (ii) Seedless types . | Nagpur Seedless, Saharanpur Seedless. |
| 3. | Assam . . . | Madhuri-am, Safri or Payera, Soh-pryiam, Amsophri and other U.P. types. |
| 4. | Bihar . . . | Safeda Allahabad, Seedless, Harijha, Red-fleshed, Chittidar. |
| 5. | Maharashtra . . | L-49, L-24, L-26, Kothrud, Sindh, Dharwar, Nasik, Dholka, Seedless Guava. |
| 6. | Madras . . . | Nagpur Seedless, Hafri, Chittidar, Bangalore, Anakapalle, Banarasi, Smooth Green. |
| 7. | West Bengal . . | Barnipore and other U.P. types. |

PAPAYA

| | |
|---|---|
| Washington . . | Fruits medium size, very sweet and excellent, flavour. |
| Gujarat. . . | Local type, fruits large, |
| Honey Dew. . . | A popular variety particularly in the South. |

LITCHI

| | | |
|---|---|---|
| 1. | Bihar . . . | China, Desi, Dehra Rose, Purbi, Bedana, Mcleen Muzaffarpur. |
| 2. | Western U. P. . . | Early seedless, Late seedless, Early Large Red, Late Large Red, Calcuttia, Rose Scented, Khalti Gulabi (Calcuttia and Late Bedana bear profusely and are of good quality). |

## STATEMENT 7

*Market charges payable by sellers and buyers in selected markets for selling guava, papaya and litchi*

(i) Kanpur (Municipal market):

By sellers:

| | | |
|---|---|---|
| 1. | Clearance charges . | Re. 1 per cart. |
| 2. | Terminal tax: | |
| | Imports . . | 40 Paise per quintal. |
| | Exports . . | 6 Paise per maund. |
| 3. | Market Fee . . | 6 Paise per package. |
| 4. | Hamali . . | 19 Paise per bag. |
| 5. | Loading and unloading | Rs. 5 per truck of 250 mds. |
| 6. | Commission . . | 6.25%. |
| 7. | Riksha charges . | 13 to 25 Paise per package |

By buyers:

| | | |
|---|---|---|
| 1. | Weighment . . | 19 P. per bag. |
| 2. | Brokerage . . | 3.25 %. |

(ii) Lucknow (Municipal market):

By sellers:

| | | |
|---|---|---|
| 1. | Entry fee . . | Re. 1 per package. |
| | | Rs. 2 to 3 per cart load. |
| | | Rs. 8 to Rs. 12 per truck. |
| 2. | Market fee . . | Rs. 4 to Rs. 5 per cart. |
| 3. | Palladari . . | Rs. 2 per cart. |
| 4. | Brokerage . . | Rs. 3 per Rs. 100. |
| 5. | Labour charges . | 3 to 12 Paise per cart. |
| 6. | Commission for outstation consignments . | 6.25%. |
| 7. | Terminal Tax . | 18 Paise to Re.1 per cart. |

By buyers:

| | | |
|---|---|---|
| 1. | Brokerage . . | Rs. 3 per cart. |

## STATEMENT 7—*contd.*

(iii) Meerut (Private market):

By sellers:

| | | |
|---|---|---|
| 1. | Clearance charges . . | Re. 1 per cart. |
| 2. | Octroi . . . . | Rs. 3 per cart. |
| 3. | Brokerage . . . | 3.25%. |
| 4. | Weighment . . . | Re. 1 per cart. |
| 5. | Loading and unloading . | 12 Paise per cart. |
| 6. | Commission for outstation consignment . . | 6.25%. |

By buyers:

| | | |
|---|---|---|
| 1. | Palladari . . . | Re. 1 per cart. |
| 2. | Brokerage . . . | 3.25%. |

(iv) Muzaffarpur:

By sellers:

| | | |
|---|---|---|
| 1. | Commission . . | 6%. |
| 2. | Handling charges . . | 2 Paise per rupee. |
| 3. | Loading charges . . | 12 Paise for small package.<br>25 Paise for large package.<br>Rs. 6 per truck. |

(v) Calcutta (Machua Bazar):

By sellers:

| | | |
|---|---|---|
| 1. | Commission . . . | 7%. |
| 2. | Handling charges . . | 25 Paise per package. |
| 3. | Dharmada . . . | 10 Paise per consignment. |
| 4. | Postage . . . | Actual expenses. |

NOTE.—Out of the commission collected from the sellers at 7%, the commission agents sometimes give a rebate of 2% at their discretion.

(vi) Delhi:

Payable by sellers:

| | | |
|---|---|---|
| 1. | Commission . . . | 6.25%. |
| 2. | Weighment . . . | 6 Paise per bag of 2 maunds. |
| 3. | Handling . . . | 6 Paise per bag of 2 maunds. |
| 4. | Charity . . . | 6 Paise per bag of 2 maunds. |

## STATEMENT 8

*Estimated annual arrivals of guava, papaya and litchi in selected markets in India*

(In tonnes)

| Sl. No. | Market | Estimated annual arrivals |
|---|---|---|
| | GUAVA | |
| 1. | Kanpur | 6,800 |
| 2. | Fatehpur | 3,700 |
| 3. | Unnao | 2,600 |
| 4. | Allahabad | 6,200 |
| 5. | Banaras | 3,650 |
| 6. | Lucknow | 4,900 |
| 7. | Sahabad | 2,800 |
| 8. | Darbhanga | 2,100 |
| 9. | Muzaffarpur | 1,900 |
| 10. | Bilaspur | 1,200 |
| 11. | Nasik | 1,180 |
| 12. | Ambala | 1,050 |
| 13. | Junagarh | 980 |
| | PAPAYA | |
| 1. | Kanpur | 7,200 |
| 2. | Dehra Dun | 5,600 |
| 3. | Banaras | 4,300 |
| 4. | Sultanpur | 1,900 |
| 5. | Meerut | 3,400 |
| 6. | Faizabad | 3,600 |
| 7. | Midnapore | 2,700 |
| 8. | Kharagpur | 3,100 |
| 9. | Ranchi | 1,500 |
| 10. | Cachar | 980 |
| | LITCHI | |
| 1. | Muzaffarpur | 2,800 |
| 2. | Darbhanga | 1,550 |
| 3. | Saran | 740 |
| 4. | Murshidabad | 1,600 |
| 5. | Midnapore | 1,350 |
| 6. | Nadia | 980 |
| 7. | Dehra Dun | 1,700 |
| 8. | Nainital | 1,350 |

## STATEMENT 9

*Types of containers used for packing guava, papaya and litchi in selected centres*

| State & Place | Type of container | Dimensions (in centi-metres) | Net weight of con-tainers (kg.) | Capa-city (kg.) | Cost per con-tainer (in Paise) | Padding material | Cost of padding material (Paise) | Lining material | Cost of lining material (Paise) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | | | A. GUAVA | | | | | | |
| Uttar Pradesh (Sirattu, Allaha-bad, Mirzapur). | 1. Bucket shaped arhar twig made basket. | TD 46, BD 28 H 30 | 0.9 | 12 | 45–55 | Dry Dhak leaves | 6–10 | Dry Dhak leaves | .. |
| | 2. Bucket shaped arhar fwig made basket. | TD 43, BD 25 H 25 | 0.9 | 5–8 | 45–55 | Do. | 4–6 | Paper | 4–6 |
| | 3. Spherical twig basket | D. 36 | 1.3 | 13 | 50–75 | Do. | 4–6 | Paper | 4–6 |
| | 4. Semi-spherical (round bottom) arhar basket | TD 48, H 41 | 0.9 | 16 | 30–40 | Do. | 6 | Nil | .. |
| | 5. Oval shaped arhar basket | TD 46, H 23 | 0.9 to 1.3 | 15–16 | 50–75 | Do. | 6 | Nil | .. |
| | 6. Barrel shaped twig basket | D 30, H 34 | 0.9 | 13 | 50–75 | Do. | 6 | Paper | 4–6 |
| (Moradabad) | 1. Wooden case | 71 × 33 × 30 | 5–6 | 27–32 | 100–125 | Straw | 6–10 | Nil | .. |
| | 2. Wooden case | 43 × 20 × 18 | 2.7 to 3.6 | 16 | 50–75 | Grass | 6–10 | Nil | .. |
| Maharashtra (Nasik, Gohilwad, Poona). | 1. Conical bamboo basket (one turned over the other). | TD 41, BD 20 H 41 | 0.4 to 0.9 | 5–8 | 18–20 | Grass, banana leaves | 4–5 | Paper | .. |

STATEMENT 9—*contd.*

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| | | | **B. PAPAYA** | | | | | | |
| Maharashtra and Gujarat (Dahanu Road, Baroda, Poona, Satara and Dhulia). | 1. Bucket shaped bamboo basket. | TD 43, BD 18 to 20, H 25 | 0.9 to 1.1 | 9–11 | 20–30 | Straw, banana leaves. | 4–6 | Paper | 4–6 |
| | 2. Bucket shaped bamboo basket. | TD 41, BD 31 H 38. | 0.9 to 1.4 | 25–38 | 20–30 | Papaya leaves, banana leaves. | 4–6 | Do. | 4–6 |
| | 3. Cylindrical bamboo basket. | D 30, H 25 | 0.4 | 14 | 30–40 | Straw | 6 | Do. | 4 |
| | 4. Bucket shaped bamboo basket. | TD 41, BD 20 H 30 | 0.4 | 14 | 20–30 | Papaya leaves. | 4–6 | Do. | 4 |
| Madhya Pradesh (Indore). | 1. Cylindrical twig basket | TD 41, BD 30 H 38 | 0.9 | 27–29 | 45–55 | Nil | .. | Do. | 6–10 |
| | 2. Cylindrical twig basket | TD 41, BD 30 H 38 | 0.9 to 1.3 | 25–38 | 20–30 | Papaya leaves, banana leaves. | 4–6 | Do. | 4 |
| Uttar Pradesh (Hapur, Meerut). | 1. Oval bamboo basket | TD 67, BD 48 H 23 | 0.9 | 41–45 | 35–45 | Straw | 6–10 | Do. | 4–5 |
| Bihar (Ranchi and Itkay). | 1. Cylindrical bamboo basket (with semi-spherical lid). | D 46, H 46 | 1.4 to 1.8 | 45–57 | 50 | Do. | 6–10 | Do. | 10 |
| | 2. Cylindrical bamboo basket (with circular lid). | D 64, H 33 | 1.4 to 1·8 | 45–57 | 50 | Do. | 6–10 | Do. | 10 |

## C. LITCHI

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Bihar (Patna, Muzaffarpur, Dalmianagar, Dhulianganga). | 1. Barrel shaped bamboo basket. | TD 30, MD36 H 33 | 0.4 to 0.9 | 16–18 | 25–32 | Green leaves. | 6 | Paper | 4 |
| | 2. Bucket shaped bamboo basket. | TD 33, MD23 H 23 | 0.7 to 0.9 | 11 | 20–25 | Do. | 6–8 | Do. | 4 |
| | 3. Semi-spherical (flat bottom) bamboo basket. | Diam. 51–56 H 25–33 | 0.9 to 1.4 | 18 | 25–40 | Litchi leaves and other green leaves. | 10–12 | Nil | .. |
| West Bengal (Jangipur). | 1. Semi-spherical (flat bottom) bamboo basket. | Diam. 51–56 H 25–33 | 0.9 to 1.4 | 18 | 25–40 | Litchi leaves. | Nil | Nil | .. |
| Uttar Pradesh (Dehra Dun). | Wooden case | 41 × 30 × 20 | 1.8 | 9 | 75 | Nil | .. | Paper | 6 |

## STATEMENT 10

*Estimated wastage of guava packed in different containers and transported by rail/road to Calcutta, Bombay and Delhi*

| Sl. No. | Packing-*cum*-despatching centres | Receiving centres | Type of container | Average time taken in transit (hours) | Average percentage of wastage |
|---|---|---|---|---|---|
| 1. | Allahabad, Mirzapur Sirathu . | Calcutta | Semi-spherical arhar basket | 54 | 8.1 |
| 2. | Allahabad . . . . | Delhi | Bucket shaped twig basket | 32 | 4.0 |
| 3. | Allahabad . . . . | Calcutta | Do. | 97 | 8.7 |
| 4. | Nasik . . . . | Bombay | Bucket shaped bamboo basket | 18* | 10.4 |
| 5. | Aligarh . . . . | Delhi | Oval shaped twig basket | 19* | 0.0 |
| 6. | Allahabad . . . . | Bombay | Barrel shaped twig basket | 35 | 14.9 |
| 7. | Allahabad . . . . | Calcutta | Oval shaped twig basket | 42 | 5.0 |
| 8. | Nasik . . . . | Bombay | Double conical bamboo basket | 19* | 9.8 |
| 9. | Moradabad . . . . | Delhi | Wooden case | 18 | 1.5 |

*By road.

Weighted average of time taken in transit — 34 hours.

Weighted average of wastage of the fruit — 6.7 per cent.

## STATEMENT 11

*Average monthly wholesale prices of guavas at Delhi*

(1957 to 1961) (Rupees per quintal)

| | 1957 | 1958 | 1959 | 1960 | 1961 |
|---|---|---|---|---|---|
| January | 25.77 | 26.79 | 21.23 | 25.45 | 24.78 |
| February | 46.89 | 26.79 | 23.44 | 31.56 | 25.45 |
| March | 48.23 | 32.15 | 33.49 | 37.81 | 40.46 |
| April | 68.75 | 41.53 | 43.89 | 54.25 | 41.98 |
| May | .. | .. | 53.88 | .. | .. |
| June | .. | .. | .. | .. | .. |
| July | .. | 24.11 | 29.47 | 21.43 | .. |
| August | .. | 21.23 | 22.45 | 23.79 | 21.11 |
| September | .. | 34.83 | 28.80 | 29.20 | 27.83 |
| October | .. | 38.58 | 29.74 | 42.87 | 37.51 |
| November | 37.51 | 43.19 | 44.21 | 41.43 | 50.23 |
| December | 26.79 | 29.47 | 31.48 | 34.24 | 36.97 |
| AVERAGE | 42.33 | 31.87 | 32.89 | 34.17 | 33.98 |

## STATEMENT 12

*Average monthly wholesale prices of guavas at Calcutta*

(1957 to 1961) (Rupees per quintal)

| | 1957 | 1958 | 1959 | 1960 | 1961 |
|---|---|---|---|---|---|
| January | 22.10 | 25.72 | 30.36 | 20.36 | 18.75 |
| February | 28.13 | 22.10 | 29.47 | 18.75 | 18.75 |
| March | .. | .. | .. | 24.11 | 17.84 |
| April | .. | .. | .. | .. | .. |
| May | .. | .. | .. | .. | .. |
| June | .. | .. | .. | .. | .. |
| July | .. | 18.75 | 26.79 | 20.09 | 26.79 |
| August | 26.79 | 22.24 | 19.42 | 20.76 | 25.45 |
| September | 27.46 | 33.49 | 14.74 | 24.11 | 25.72 |
| October | .. | .. | 21.43 | .. | 28.13 |
| November | .. | .. | .. | .. | .. |
| December | .. | .. | .. | .. | .. |
| AVERAGE | 26.12 | 24.46 | 23.70 | 21.36 | 23.06 |

## STATEMENT 13

*Average monthly wholesale prices of papaya at Delhi*

(1957 to 1961) (Rupees per quintal)

| | 1957 | 1958 | 1959 | 1960 | 1961 |
|---|---|---|---|---|---|
| January | 40.19 | 66.98 | 54.39 | 55.73 | 42.20 |
| February | 42.87 | 66.47 | 35.50 | 42.87 | 32.15 |
| March | 46.08 | 51.92 | 34.83 | 38.50 | 43.94 |
| April | 50.91 | 43.89 | 38.18 | 40.99 | 42.87 |
| May | 60.01 | 50.91 | 53.58 | 32.15 | 58.94 |
| June | 98.46 | 70.54 | 62.96 | 32.82 | 51.98 |
| July | 59.93 | 75.02 | 62.96 | 53.05 | 48.23 |
| August | 74.21 | 76.81 | 73.68 | 52.24 | 58.94 |
| September | 58.94 | 73.68 | 75.02 | 50.37 | 58.94 |
| October | 61.62 | 67.52 | 75.55 | 81.05 | 97.99 |
| November | 65.64 | 63.31 | 73.68 | 71.00 | 97.79 |
| December | 66.98 | 52.24 | 60.95 | 62.96 | 64.30 |
| AVERAGE | 60.49 | 63.27 | 58.44 | 51.14 | 58.17 |

## STATEMENT 14

*Average monthly wholesale prices of papaya at Calcutta*

(1957 to 1961) (Rupees per quintal)

| | 1957 | 1958 | 1959 | 1960 | 1961 |
|---|---|---|---|---|---|
| January | 53.58 | 71.67 | 43.40 | 61.09 | 66.98 |
| February | 54.92 | 54.92 | 53.58 | 62.96 | 66.98 |
| March | 63.77 | 58.94 | 75.02 | 67.65 | 66.98 |
| April | 64.97 | 62.96 | 90.42 | 72.34 | 80.38 |
| May | 63.23 | 53.58 | 75.02 | 83.73 | 75.69 |
| June | 87.07 | 66.98 | 72.34 | 80.38 | 66.98 |
| July | 100.47 | 103.82 | 93.77 | 80.38 | 97.12 |
| August | 115.21 | 117.87 | 93.77 | 115.21 | 107.17 |
| September | 120.57 | 130.61 | 107.17 | 133.96 | 107.17 |
| October | 120.57 | 79.84 | 104.49 | 133.96 | 107.17 |
| November | 109.85 | 64.97 | 80.38 | 117.22 | 107.15 |
| December | 88.41 | 43.40 | 70.33 | 78.23 | 107.17 |
| AVERAGE | 86.88 | 75.80 | 79.97 | 90.59 | 88.08 |

## STATEMENT 15

*Average monthly wholesale prices of litchi at Delhi*

(1957 to 1961) (Rupees per quintal)

| | 1957 | 1958 | 1959 | 1960 | 1961 |
|---|---|---|---|---|---|
| May . . | 100.47 | 123.24 | 133.96 | 128.60 | 142.88 |
| June . . | 98.78 | 131.95 | 95.43 | 148.70 | 129.67 |
| July . . | 90.42 | .. | 147.36 | .. | 139.32 |
| AVERAGE . | 96.55 | 127.59 | 125.58 | 138.65 | 137.29 |

## STATEMENT 16

*Average monthly retail prices of guavas at Delhi*

(1957 to 1961) (Rupees per kg.)

| | 1957 | 1958 | 1959 | 1960 | 1961 |
|---|---|---|---|---|---|
| January . . | 0.32 | 0.33 | 0.33 | 0.33 | 0.36 |
| February . . | 0.56 | 0.33 | 0.34 | 0.40 | 0.34 |
| March . . | 0.60 | 0.36 | 0.50 | 0.50 | 0.52 |
| April . . . | 0.85 | 0.54 | 0.54 | 0.66 | 0·51 |
| May . . . | .. | .. | 0.66 | .. | .. |
| June . . . | .. | .. | .. | .. | .. |
| July . . . | .. | 0.33 | 0.42 | .. | .. |
| August . . | .. | 0.33 | 0.33 | 0.41 | 0.33 |
| September . . | .. | 0.45 | 0.48 | 0.39 | 0.54 |
| October . . | .. | 0.53 | 0.39 | 0.57 | 0.57 |
| November . . | 0.50 | 0.66 | 0.54 | 0.61 | 0.73 |
| December . . | 0.33 | 0.41 | 0.42 | 0.50 | 0.54 |
| AVERAGE . | 0.52 | 0.43 | 0.45 | 0.49 | 0.46 |

## STATEMENT 17

*Monthly retail prices of papaya at Delhi*

(1957 to 1961) (Rupees per kg.)

| | 1957 | 1958 | 1959 | 1960 | 1961 |
|---|---|---|---|---|---|
| January . . | 2.52 | 2.17 | 1.66 | 1.74 | 1.42 |
| February . . | 1.34 | 2.17 | 1.18 | 1.18 | 1.18 |
| March . . | 1.45 | 1.71 | 1.10 | 1.29 | 1.47 |
| April . . . | 1.53 | 1.45 | 1.21 | 1.34 | 1.50 |
| May . . . | 1.71 | 1.58 | 1.69 | 1.02 | 1.74 |
| June . . . | 2.22 | 1.98 | 1.93 | 1.26 | 1.66 |
| July . . . | 1.85 | 2.17 | 1.93 | 1.66 | 1.55 |
| August . . | 2.44 | 2.17 | 2.30 | 1.66 | 2.17 |
| September . . | 2.09 | 2.14 | 2.22 | 1.61 | 1.98 |
| October . . | 2.17 | 2.12 | 2.44 | 2.44 | 3.05 |
| November . . | 2.17 | 2.01 | 2.14 | 1.96 | 3.05 |
| December . . | 2.17 | 1.58 | 1.85 | 1.98 | 2.15 |
| AVERAGE . . | 1.97 | 1.94 | 1.80 | 1.60 | 1.91 |

## STATEMENT 18

*Average monthly retail prices of litchi at Delhi*

(1957 to 1961) (Rupees per Kg.)

| | 1957 | 1958 | 1959 | 1960 | 1961 |
|---|---|---|---|---|---|
| May . . . | 1.13 | 1.64 | 1.76 | 2.05 | 1.69 |
| June . . . | 1.26 | 1.67 | 1.36 | 2.20 | 1.87 |
| July . . . | 1.13 | .. | 1.88 | .. | 2.41 |
| AVERAGE . . | 1.17 | 1.65 | 1.66 | 2.12 | 1.99 |

## STATEMENT 19

*Percentage deviation of the average monthly wholesale prices of guava and papaya over their annual mean*

(Average of five years: 1957 to 1961)

(Actuals in rupees per quintal)

| | Guava | | | | Papaya | | | |
|---|---|---|---|---|---|---|---|---|
| | Calcutta | | Delhi | | Calcutta | | Delhi | |
| | Actuals (Rs.) | Percentage | Actuals (Rs.) | Percentage | Actuals (Rs.) | Percentage | Actuals (Rs.) | Percentage |
| January . . | +0.06 | + 0.26 | —10.40 | —29.55 | —24.92 | —29.57 | — 6.40 | —10.98 |
| February . . | +0.04 | + 0.17 | — 4.37 | —12.42 | —25.60 | —30.38 | —14.33 | —24.58 |
| March . . | —2.42 | —10.34 | + 3.23 | + 9.18 | —17.80 | —21.12 | —15.25 | —26.16 |
| April . . . | .. | .. | +14.88 | +42.28 | —10.05 | —11.92 | —14.93 | —25.61 |
| May . . . | .. | .. | +18.38 | +52.22 | —14.02 | —16.63 | — 7.19 | —12.33 |
| June . . . | .. | .. | .. | .. | — 9.52 | —11.29 | + 5.05 | + 8.66 |
| July . . . | —0.29 | — 1.24 | —10.20 | —28.98 | +10.84 | +12.86 | + 1.53 | + 2.62 |
| August . . . | —0.47 | — 2.01 | —13.05 | —37.08 | +25.58 | +30.36 | + 8.87 | +15.22 |
| September . | +1.70 | +7.26 | —5.16 | —14.66 | +35.63 | +42.28 | + 5.09 | + 8.73 |
| October . . | +1.38 | +5.90 | +1.98 | + 5.63 | +24.94 | +29.60 | +18.40 | +31.56 |
| November . . | .. | .. | + 8.12 | +23.07 | +11.65 | +13.83 | +15.98 | +27.41 |
| December . . | .. | .. | — 3.41 | — 9.69 | — 6.76 | — 8.02 | + 3.18 | + 5.46 |

## STATEMENT 20

*Percentage deviation of the average monthly retail prices of guava and papaya at Delhi market over their respective annual mean*

(Average of five years: 1957 to 1961) (Actuals in rupees per kg.)

| | Guava | | Papaya | |
|---|---|---|---|---|
| | Actuals (Rs.) | Percentage | Actuals (Rs.) | Percentage |
| January | —0.14 | —29.79 | +0.06 | + 3.26 |
| February | —0.08 | —17.02 | —0.43 | —23.37 |
| March | —0.07 | —14.89 | —0.44 | —23.91 |
| April | +0.15 | +31.91 | —0.44 | —23.91 |
| May | +0.19 | +40.42 | —0.30 | —16.31 |
| June | .. | .. | —0.03 | — 1.63 |
| July | —0.09 | —19.15 | —0.01 | — 0.54 |
| August | —0.12 | —25.53 | +0.30 | +16.30 |
| September | .. | .. | +0.16 | + 8.69 |
| October | +0.35 | +10.64 | +0.60 | +32.61 |
| November | +0.14 | +29.79 | +0.42 | +22.83 |
| December | —0.03 | — 6.38 | +0.11 | + 5.98 |

# STATEMENT 21

## *Price Spread Examples*

### Example 1

Commodity: Litchi fruits. Variety: Calcutta.

Quantity: 40 seers.

A producer in a village near Saharanpur sells his litchi fruits to an exporter at Saharanpur who in turn despatches the fruits to a retailer at Delhi. From the retailer to the consumer:

| | | Rs. p. | Percentage |
|---|---|---|---|
| 1. Net price realised by the producer | | 34 80 | 59.5 |
| 2. Expenses incurred by the producer: | | | |
| (i) Cost of preparing for the market . . . . | 0.67 | | |
| (ii) Containers . . . | 4.00 | | |
| (iii) Cost of packing including cost of packing materials | 1.00 | | |
| (iv) Transport from farm to the market. . . . | 0.67 | | |
| (v) Toll . . . . | 0.15 | | |
| (vi) Loading and unloading . | 0.31 | | |
| (vii) Market fee . . . | 0.05 | | |
| (viii) Commission . . . | 1.25 | | |
| (ix) Charity . . . . | 0.10 | 8.20 | 14.0 |
| 3. Price paid to the producer by the exporter. | | 43.00 | 73.5 |
| 4. Expenses incurred by the exporter: | | | |
| (i) Loading charges . . | 0.15 | | |
| (ii) Transport charges . . | 1.85 | | |
| (iii) Octroi . . . . | 0.25 | | |
| (iv) Unloading charges . . | 0.31 | | |
| (v) Commission . . . | 3.12 | 5.68 | 9.7 |
| 5. Margin to the exporter. | | 3.72 | 6.4 |
| 6. Price paid to the exporter by the retailer. . . . . | | 52.40 | 89.6 |
| 7. Expenses incurred by the retailer: | | | |
| (i) Cartage . . . . | 0.67 | | |
| (ii) Labour . . . . | 0.31 | 0.98 | 1.7 |
| 8. Margin to the retailer. . . | | 5.10 | 8.7 |
| 9. Price paid by the consumer . | | 58.48 | 100.0 |

## STATEMENT 21 – *contd.*

**Example 2**

Commodity: Litchi. Variety: Caleutta.

Quantity: One maund

Producer in village Kalispur near Saharanpur sells his litchi fruits direetly to retailer in Saharanpur. From retailer to eonsumer in Saharanpur.

| | | Rs. p. | Percentage |
|---|---|---|---|
| 1. Net price realised by the producer. . . . . | | 27.13 | 75.4 |
| 2. Expenses incurred by the producer | | | |
| (i) Cost of preparing the fruits: . . . . | 0.50 | | |
| (ii) Transport charges to market . . . . | 0.37 | | |
| (iii) Toll tax . . . . | 0.15 | | |
| (iv) Commission . . . | 1.80 | | |
| (v) Market fee . . . | 0.05 | 2.87 | 7.9 |
| 3. Price paid by the retailer to the producer for 40 seers at 75 Paise per seer . . . | | 30.00 | 83.3 |
| 4. Expenses incurred by the retailer: | | | |
| (i) Cartage . . . . | 0.50 | | |
| (ii) Other expense . . . | 0.25 | 0.75 | 2.1 |
| 5. Margin to the retailer . . | | 5.25 | 14.6 |
| 6. Priee paid by the consumer for 36 seers (loss during marketing 4 seers) @ Re. 1 per seer . . | | 36.00 | 100.0 |

## STATEMENT 21—*contd.*

**Example 3**

Commodity: Papaya. Variety: Common Deshi

Quantity: 4 quintal

Producer in village near Amroha (Moradabad district) sells papaya fruits to an in exporter Amroha, who in turn, despatches the fruits to a wholesaler in Delhi. From the wholesaler to retailers and then to consumer.

| | | Rs. p. | Percentage |
|---|---|---|---|
| 1. Net price realised by the producer | | 91.15 | 42.9 |
| 2. Expenses incurred by the producer: | | | |
| (i) Cost of preparation | 1.25 | | |
| (ii) Transport costs | 2.00 | | |
| (iii) Octroi | 1.60 | 4.85 | 2.3 |
| 3. Price paid to the producer by the exporter: | | 96.00 | 45.2 |
| 4. Expenses incurred by the exporter: | | | |
| (i) Cost of packing | 3.25 | | |
| (ii) Cost of containers including packing materials | 26.00 | | |
| (iii) Transport to Railway Station | 2.44 | | |
| (iv) Expenses at Railway Station | 0.37 | | |
| (v) Railway freight | 10.18 | | |
| (vi) Transport from Station to market | 4.03 | | |
| (vii) Commission | 5.00 | 51.27 | 24.1 |
| 5. Margin to exporter | | 12.73 | 6.0 |
| 6. Price paid by the wholesaler to the exporter | | 160.00 | 75.3 |
| 7. Wholesaler's expenses: | | | |
| (i) Cartage to godown | 2.00 | | |
| (ii) Miscellaneous charges | 1.00 | 3.00 | 1.6 |
| 8. Wholesaler's margin | | 14.25 | 6.7 |
| 9. Price paid by the retailer to the wholesaler | | 177.25 | 83.6 |

STATEMENT 21—*concld.*

| | | | Rs. p. | Percentage |
|---|---|---|---|---|
| 10. | Retailer's expenses: | | | |
| | (i) Cartage . . . . | 3.25 | | |
| | (ii) Loading and unloading. . | 1.62 | 4.87 | 2.3 |
| 11. | Retailer's margin . . . | ——— | 30.18 | 14.1 |
| 12. | Consumer's price . . . | | 212.30 | 100.0 |

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